



SAFETY DATA SHEET



JSC "Uralektromed"

1. IDENTIFICATION OF THE SUBSTANCE\PREPARATION AND OF THE COMPANY\UNDERTAKING

Identification of the substance/preparation	COPPER SULPHATE PENTAHYDRATE /CUPRIC SULPHATE PENTAHYDRATE E4, EC: 231-847-6, CAS: 7758-99-8
Product code	CuSO ₄ * 5H ₂ O
Molecular formula	Copper sulphate pentahydrate/Cupric sulphate pentahydrate
Trade name	-Feed additive.
Use of the substance/preparation	
Version No.	02/6
Revision date	15-June-2017
SDS Number	PB-00194429-006-2017
Manufacturer/Supplier	JSC "Uralektromed" 1, Uspensky Avenue, Verkhnyaya Pyshma, 624091 Sverdlovsk region, Russia Tel. +7 34368 47373, +7 34368 46193; fax: +7 34368 9 82 43 Contact person: person: Natalya Serebryakova Email: snv@elem.ru oxana@ugmk.com ; http: www.elem.ru
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For feed industry	
Production	Additives: Category 3 nutritional additive
Functional group	b) compounds of trace elements
FAMI-QS Certification-Registration Nr.	12 027 53165 TMS
FAMI-QS Registration Nr.:	FAM-0182
Certificate validity	2016-12-23 - 2019-12-22

Directions for use see in Council Directive concerning additives in feedingstuffs No. 70/524/EEC dd. 23.11.1970 and Commission Regulation (EC) No.1334/2003 dd. 25.07.2003, amending the Council Directive No. 70/524/EEC.

2. HAZARDS IDENTIFICATION

Copper sulphate pentahydrate (Harmonised classification and labeling listed in Regulation (EC) No 1272/2008)

Harmonised classification and labeling published in Regulation (EC) No. 1272/2008 is also applicable to hydrated forms of the compound.

Classification

The substance is classified as follows:

<ul style="list-style-type: none">• for physical-chemical properties:	No classification
<ul style="list-style-type: none">• for health hazard:<ul style="list-style-type: none">- Acute toxicity oral:- Skin corrosion/Irritation:- Serious damage/eye irritation:	Acute Tox. 4 (Hazard statement: H302: Harmful if swallowed.) Skin Irrit. 2 (H315: Causes skin irritation) Eye Irrit. 2 (H319: Causes serious eye irritation)
<ul style="list-style-type: none">• For environmental hazards:<ul style="list-style-type: none">- Hazards to the aquatic environment:- M-factor:	Aquatic Chronic 1 (H410: Very toxic to aquatic life with long lasting effects.) 10

Labelling

Signal word: Warning

Hazard pictogram:

GHS07: exclamation mark



GHS09: environment



Hazard statements:

H302: Harmful if swallowed.
H319: Causes serious eye irritation.
H315: Causes skin irritation.
H410: Very toxic to aquatic life with long lasting effects.

Precautionary statements:

P264: Wash... thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P301+P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P330: Rinse mouth.
P501: Dispose of contents/container to ...
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice/attention.
P302+P352: IF ON SKIN: Wash with plenty of soap and water.
P321: Specific treatment (see... on this label).
P333+P313: If skin irritation or rash occurs: Get medical advice/attention.
P362: Take off contaminated clothing and wash before reuse.
P273: Avoid release to the environment.
P391: Collect spillage.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Degree of purity >=99,1%(w/w).

Constituents:

Element	Norms in accordance with	
	TY 2141-100-00194429-2015	EC Regulatory documents (2002/32/EC and its amendments)
Cupric sulphate pentahydrate, min	99,1 %	-
Copper (Cu), min	25,22 %	-
Free sulphuric acid, max	0,1 %	-
Arsenic (As), max	10 мг/кг	50 mg/kg
Lead (Pb), max	70 мг/кг	100 mg/kg
Cadmium (Cd), max	10 мг/кг	10 mg/kg
Mercury (Hg), max	0,1 мг/кг	0,1 mg/kg
Nickel (Ni), max	50 мг/кг	-
Dioxins expressed as toxic equivalent: <ul style="list-style-type: none"> • sum of polychlorinated dibenzo-para-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), and sum of dioxins and dioxin-like PCBs (sum of PCDDs, PCDFs and polychlorinated biphenyls (PCBs), max • non-dioxin-like PCBs (indicative), max 	1,5 ng/kg 10,0 µ/kg (10 000 ng/kg)	1,5 ng/kg 10,0 µ/kg (10 000 ng/kg)

4. FIRST-AID MEASURES

Inhalation	If possible reduce exposure using fresh air. Remove from exposure, take the person to a well aerated place and keep calm. Seek medical advice.
Skin contact	Take off contaminated clothes and wash with soap and plenty of water all the contaminated parts of the body. In case of irritation, seek medical advice.
Eye contact	Wash immediately with plenty of water for at least 15 minutes. Seek medical advice.
Ingestion	If swallowed, seek immediately medical advice. Show this safety data sheet or the label.
General advice	Get medical attention if any discomfort develops. Show this safety data sheet to the doctor in attendance.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	Product is not flammable. Use extinguishing media appropriate for surrounding fire (micronized water, CO ₂ , foam). Collect the contaminated water to avoid reaching of sewers or water courses.
Special hazards arising from the substance:	Avoid breathing fumes that could be toxic (presence of sulphur oxides Sox).
Special protective equipment for fire-fighters	Fire-fighters should wear proper protective equipment and self-contained (positive pressure if available) breathing apparatus with full face piece.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	Protect adequately all the body parts. The air passages must be protected (suitable filter mask) if the material is in microcrystals form (higher probability that the product forms dust). Keep away unauthorized people, children and animals.
Environmental precautions	Use sand or soil to contain the loss of product. Avoid the possibility that significant quantities of product can enter water courses or sewer; if this should happen advise immediately the local competent authority.
Methods for cleaning up	Cover the product with sand or soil and carefully clean up the product. Put it into another clean and dry container, close and remove it from the area. Do not clean contaminated area with water.

7. HANDLING AND STORAGE

Precautions for safe handling	Avoid dust formation. Do not breathe dust. Handle in a well ventilated area or wear adequate respiratory protection (anti-dust mask). Avoid contact with skin and eyes wearing working clothes, gloves and protective glasses. Do not eat, smoke or drink during use. After use keep the packaging well closed.
Conditions for safe storage, including any incompatibilities	Keep in sealed containers away from humidity and sunlight. Store the product in a well ventilated warehouse away from flammable product. Keep out of the reach of children, animal and unauthorized people. Keep away from food, drink and feeding stuff.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

No data on exposure limit values for copper sulfate.

8.1 Control parameters of relevance to industrial settings (occurrence of dusts, mist, fumes)

8.1.1 The following current national occupational exposure limit values for copper and copper compounds apply:

Country	Occupational exposure limit	Maximum exposure time	Document number-Date	Basis	Link to the legislation
UK	0.2 mg Cu (fume)/m ³ 1 mg Cu (dust and mist)/m ³	8h TWA (dust and mist)/m ³	2007	Copper	Health and Safety Executive- http://www.hse.gov.uk/coshh/table1.pdf
Finland	0.1 mg Cu (alveolar)/m ³ 1 mg Cu (dust and mist)/m ³	8h TWA	2009	Copper	The Ministry of Social Affairs and Health- http://pre20090115.stm.fi/hm1113394626349/passthru.pdf
Belgium	0.2 mg Cu (fume)/m ³ 1 mg Cu (dust and mist)/m ³	8h TWA	2007	Copper	Service public fédéral Emploi, Travail et Concertation sociale- http://www.emploi.belgique.be/WorkArea/showcontent.aspx?id=23914
France	0.2 mg Cu (fume)/m ³ 1 mg Cu (dust)/m ³	8h TWA	2008	Copper	INSTITUT NATIONAL DE RECHERCHE ET DE SÉCURITÉ- http://en.inrs.fr/inrs-pub/inrs01.nsf/IntranetObject-accesParReference/ED%20984/\$File/ED984.pdf

8.1.2 PNECs and DNELs

Exposure pattern	Route	Descriptor	DNEL / PNEC
Human –Long-term –systemic effects for workers and general population	Oral, dermal and inhalation	Internal dose DNEL (Derived No Effect Level) Using absorption factors of 25% for oral, 100% for inhalation (respirable) and 0.03% for dermal exposure routes	0.041mg Cu/kg B wt/d
Human –Short-term –systemic effects	Oral, dermal and inhalation	Internal dose DNEL (Derived No Effect Level) Using absorption factors of 25% for oral, 100% for inhalation (respirable) and 0.03% for dermal exposure routes	0.082mg Cu/kg B wt/d
Human – Long-term and Short-term	Inhalation	External Inhalation DNEL (Derived No Effect Level) For copper dust and copper fume in Europe in many countries	1 mg/m ³ for copper dust 0.1 mg/m ³ for copper fume
Human – Long-term and Short-term	Dermal	External Dermal DNEL (Derived No Effect Level) Using dermal penetration factors of 0.03% for dry copper and copper compounds and 0.3% for copper and copper compounds in solution suspension	136.67 mg Cu/kg bw/d for dry copper and copper compounds 13.67 mg Cu/kg bw/d for copper and copper compounds in a slurry/solution
Environmental	Freshwater	PNEC (Predicted No Effect Concentration)	7.8 µg dissolved Cu/L (1)
Environmental	Marine water	PNEC (Predicted No Effect Concentration)	5.2 µg dissolved Cu/L (1)
Environmental	Sediment freshwater	PNEC (Predicted No Effect Concentration) Includes a default bio-availability correction	87 mg Cu/kg dry weight (1)
Environmental	Sediment estuarine	PNEC (Predicted No Effect Concentration)	288 mg Cu/kg dry weight (1) 64 mg Cu/kg wet weight (1)
Environmental	Sediment marine	PNEC (Predicted No Effect Concentration)	676 mg Cu/kg dry weight (1) 148 mg Cu/kg wet weight (1)
Environmental	Soil	PNEC (Predicted No Effect Concentration)	65 mg Cu/kg dry weight (1)
Environmental	STP	PNEC (Predicted No Effect Concentration)	230g dissolved Cu/L
Environmental	birds	PNEC Oral (secondary poisoning)	No potential for bioaccumulation as agreed by the Competent Authorities for Biocides and Existing Substance Regulation

(1) Default PNEC values are given. These can be refined if information on local environment is available.

8.2 Exposure controls for industrial and professional uses of copper compounds

8.2.1 Appropriate engineering controls at industrial settings

Prevent formation of dust where possible. Use local exhaust ventilation, sealed equipment and package or other exposure level control devices to maintain concentration in air below recommended exposure limits.

Any deposit of dust which cannot be avoided should be regularly removed preferably using appropriate industrial vacuum cleaners or central vacuum systems.

In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter (type P2). Seek advice from local supervisor.

Waste air should be released into the atmosphere only after it has passed through suitable dust separators.

Waste water generated during the production process or cleaning operations should be collected and should preferably be treated in an on-site or off-site waste water treatment plant which ensures efficient (min. 92 %) removal of copper.

8.2.2 Individual protection measures, such as personal protective equipment

Eye/face protection:

Copper sulphate is considered to be classified as a severe eye irritant. Wearing of suitable safety glasses is compulsory.

Skin protection:

Copper sulphate is classified as a skin irritant. Wearing of gloves and protective clothes is compulsory.

Respiratory protection:

Avoid generation of fumes and dusts.

Avoid generation and spreading of dust - Use local ventilation to keep levels below established threshold values. A suitable particle filter mask is recommended.

Thermal hazards

Not applicable. Copper does not have any self-heating or auto-flammable properties.

Hygiene measures

Store and handle in accordance with good industrial hygiene and safety practices. Wash hands after handling. Routinely wash work clothing and protective equipment to remove contaminants. Observe any medical surveillance requirements.

8.2.3 Environmental exposure controls

Avoid release to the environment.

9. PHYSICAL AND CHEMICAL PROPERTIES

Property	Value	Remarks
Physical state at 20°C and 101.3 kPa	<u>Copper sulphate pentahydrate:</u> Solid	<u>Copper sulphate pentahydrate:</u> Form: Crystalline Colour: Blue Odour: Odourless
Melting/freezing point	<u>Copper sulphate pentahydrate:</u> Decomposes without melting at 110 °C.	
Boiling point	<u>Copper sulphate pentahydrate:</u> Decomposes without boiling at 110 °C.	
Relative density	<u>Copper sulphate pentahydrate:</u> 2.286 g/cm ³	
Vapour pressure	Not applicable	The following waiver applies to both the anhydrous and pentahydrate forms of copper sulphate: Copper sulphate is an inorganic salt and as such has negligible vapour pressure at environmentally relevant temperatures.
Surface tension	Not applicable	The following waiver applies to both the anhydrous and pentahydrate forms of copper sulphate: Surface tension is not applicable to inorganic salts.

Property	Value	Remarks
Water solubility	<u>Copper sulphate pentahydrate:</u> 22 g/100 g H ₂ O at 25°C	
Partition coefficient n-octanol/water (log value)	Not applicable	The following waiver applies to both the anhydrous and pentahydrate forms of copper sulphate:
Flash point	Not applicable	The following waiver applies to both the anhydrous and pentahydrate forms of copper sulphate: The determination of flash point is not required because the substance is a solid.
Flammability	Not applicable	The following waiver applies to both the anhydrous and pentahydrate forms of copper sulphate: Copper sulphate is an inorganic salt with copper in a high oxidation state. As such this material is not likely to undergo self-heating under bulk storage conditions and is unlikely to auto-ignite. Self-heating or auto-ignition has not been observed with copper sulphate following use for many years.
Explosive properties	Not applicable	The following waiver applies to both the anhydrous and pentahydrate forms of copper sulphate: Copper sulphate is a stable inorganic substance. None of the components or groups are associated with explosive hazards. All are stable groupings in high oxidation states. Copper sulphate therefore will not have explosive properties and experience in use over many years confirms this conclusion.
Self-ignition temperature	Not applicable	The following waiver applies to both the anhydrous and pentahydrate forms of copper sulphate: Copper sulphate is an inorganic salt with copper in a high oxidation state. As such this material is not likely to undergo self-heating under bulk storage conditions and is unlikely to auto-ignite. Self-heating or auto-ignition has not been observed with copper sulphate following use for many years.

Property	Value	Remarks
Oxidising properties	Not applicable	<p>The following waiver applies to both the anhydrous and pentahydrate forms of copper sulphate:</p> <p>Oxidising compounds are materials that can easily transfer oxygen to other compounds, i.e. they contain weakly bound oxygen, for example NO₃ and peroxides. Bound oxygen must also become available through a low energy degradation route with a low energy of activation. The oxygen in copper sulphate pentahydrate is bound in stable sulphate structural groupings with strong oxygen bonds. The decomposition temperature of copper sulphate is also high indicating a high energy of activation. Copper sulphate is therefore considered inert under the conditions of oxidation.</p> <p>Experience in using copper sulphate over many years also indicates that it is not associated with oxidising hazards.</p>
Granulometry	<p>The mean of the volume-rated distributions: D(v, 0.1) 80.7 µm; D(v, 0.5) 256 µm; D(v, 0.9) 516 µm.</p> <p>The mean of the number- rated distributions: D(n, 0.1) 4.67 µm; D(n, 0.5) 6.15 µm; D(n, 0.9) 14.5 µm.</p>	<p>The following applies to both the anhydrous and pentahydrate forms of copper sulphate:</p> <p>To account for the possibility that materials with a smaller particle size may be produced for certain specialist uses, the Exposure Scenarios developed under REACH are based on the worst-case assumption that 100% of any material becoming airborne is respirable.</p>
Stability in organic solvents and identity of relevant degradation products	Not applicable	<p>The following waiver applies to both the anhydrous and pentahydrate forms of copper sulphate:</p>
Dissociation constant	Not applicable	<p>The following waiver applies to both the anhydrous and pentahydrate forms of copper sulphate:</p> <p>Dissociation is a reversible equilibrium process where a species exists either in an ionised or an unionised solution state. The dissociation constant (pKa) is effectively the ratio of the associated (unionised) to dissociated (ionised) substance in solution. Copper is a poorly soluble metallic element that can only remain in solution in a totally dissociated ionic state: a non-reversible process. Since its solubility is low and it does not exist in solution in an associated state, it does not therefore have a measurable dissociation constant.</p>

Property	Value	Remarks
Viscosity	Not applicable	The following waiver applies to both the anhydrous and pentahydrate forms of copper sulphate: The determination of viscosity is not required because the substance is a solid.
Auto flammability	Not applicable	The following waiver applies to both the anhydrous and pentahydrate forms of copper sulphate: Copper sulphate is an inorganic salt with copper in a high oxidation state. As such this material is not likely to undergo self-heating under bulk storage conditions and is unlikely to auto-ignite. Self-heating or auto-ignition has not been observed with copper sulphate following use for many years.

10. STABILITY AND REACTIVITY

Reactivity	Not applicable
Chemical stability	Copper sulfate is stable under normal conditions of use, storage and transport.
Possibility of hazardous reaction	Reaction with H- equivalents releases soluble copper compounds.
Conditions to avoid	Avoid dust formation and contact with acids.
Incompatible materials	Acids. Alkalis. Organic substances. Interacts with ammonia; forms complex salts.
Hazardous decomposition products	Not applicable.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

The toxicological information was obtained from the Risk Assessment Report on copper and copper compounds, assessed by the EC Technical Committee for New and Existing Substances (TCNES) and the EC Scientific Committee on Health and Environmental Risks (SCHER) (see: http://echa.europa.eu/chem_data/transit_measures/vrar_en.asp), and supplemented with recent information gathered for the REACH registration. The additional information confirms the hazard profile derived for copper sulphate pentahydrate as well as the DNELs derived.

Most of the available hazard data are related to exposure of soluble copper compounds, i.e. copper sulphate. Information on solubility, bioaccessibility and bioavailability is combined for the hazard profile of copper in massive forms with the hazard profile of soluble copper compounds in a read-across approach to assess its potential hazards.

Acute toxicity	The classification criteria for very fine and soluble "copper" bearing substances, including copper sulphate according to the regulations (EC) No 1272/2008 and 67/548/EEC on acute toxicity, lead to a classification as "harmful if swallowed and if inhaled".
STOT single exposure	The effects following acute toxicity (oral and inhalation – see above) have been used for the classification as harmful. The local oral and inhalation effects resulted in mortality.
Skin/eye	The data have demonstrated that according to Regulations (EC) No 1272 and 67/548/EEC,

irritation/corrosion	copper sulphate pentahydrate is irritating to skin. Animal studies induced that copper sulphate pentahydrate is considered to be classified as a severe eye irritant (H319). From the dermal and eye irritation studies, copper sulphate is not a corrosive compound.
Respiratory or Skin Sensitisation	There are no applicable data available on the irritancy of copper sulphate pentahydrate on the respiratory tract.
Genotoxicity	Copper sulphate pentahydrate, copper and other copper compounds are not considered genotoxic.
Carcinogenicity	Copper compounds do not raise concerns with respect to carcinogenic activity.
Toxicity for reproduction	It is considered inappropriate to observe copper and copper compounds as potential teratogenic compounds due to the complex role of copper in regulating normal foetus development in humans at levels considered higher than would be expected to occur through the normal production and use of any copper compound. Conclusive but not sufficient for classification.
Repeated dose toxicity and STOT-RE	

12. ECOLOGICAL INFORMATION

The ecotoxicological information was obtained from the Risk Assessment report on copper and copper compounds, assessed by the EC Technical Committee for New and Existing Substances (TCNES) and the EC Scientific Committee on Health and Environmental Risks (SCHER) (see: http://echa.europa.eu/chem_data/transit_measures/vrar_en.asp), and supplemented with recent information gathered for the REACH registration. The additional information confirms the hazard profile derived for copper sulphate and refined the PNECs derived for the some compartments (soil and marine waters).

Most of the available hazard data are related to exposure of soluble copper compounds, i.e. copper sulphate. Information on solubility and bioavailability are combined for copper massive forms and the hazard profile of soluble copper compounds in a read-across approach to assess its potential hazards.

Endpoint	Hazard category	Hazard statement	Reason for no classification
Hazards to the aquatic environment (acute/short-term):	Aquatic Acute 1	H400: Very toxic to aquatic life.	
Hazards to the aquatic environment (long-term):	Aquatic Chronic 1	H410: Very toxic to aquatic life with long lasting effects.	
M-Factor acute: 10			
Hazardous to the ozone layer:			conclusive but not sufficient for classification

12.3 Bioaccumulative potential

Copper is well regulated in all living organisms and BCF and BAF values have no meaning for a hazard assessment. There is no indication of a bioaccumulation potential.

12.4 Mobility in soil

Copper-ions bind strongly to the soil matrix. The binding depends on the soil properties. A median water-soil partitioning coefficient (K_p) of 2120 L/kg has been derived for soils (more details see Copper Risk Assessment Report, 2008 and Copper Chemical Safety Report, 2010).

12.5 Results of PBT and vPvB assessment

The PBT and vPvB criteria of Annex XIII to the Regulation do not apply to inorganic substances, such as copper and its inorganic compounds.
Copper is not PBT or vPvB.

12.6 Other adverse effects

Copper is not expected to contribute to ozone depletion, ozone formation, global warming or acidification.

13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility.

14. TRANSPORT INFORMATION

ADR/RID	No. UN-3077, Class 9, Packaging Group III.
IATA/ICAO	No. UN-3077, Class 9, Packaging Group III.
IMDG	Copper sulfate is sea pollutant. Emergency cards F-A S-F if transported by sea.
SMGS(Agreement on International Goods Transport by Rail Road)	Hazard code - 90-other dangerous and hazardous substances, number in Table - 12c) Emergency card No. 906 if transported by rail.

15. REGULATORY INFORMATION

EC Number	231-847-6
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16. OTHER INFORMATION

The data herein are based on our latest knowledge but do not constitute a guarantee for any specific product features and do not establish any legally valid contractual relationship.

Issue date	15-June-2017
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