

Safety Data Sheet

According to: The Regulations for Hazardous Chemical Agents, 2021 and
Globally Harmonized System of Classification and Labelling of Chemicals (GHS) Rev. 9.



www.kimleigh.com

TEL: | +27 18 293 1028 | +27 18 285 1014

Reg. No. 1974/000531/07

PO Box 1097 | Potchefstroom | 2520 | South Africa

11 Jasper vd Westhuizen Str | Potchindustria | Potchefstroom | 2531

Product range: *AqCua*®

SECTION 1: Identification of the substance / mixture and of the supplier

1.1 Product identifiers

Product (trade) name : *AqCua*® CS98-TECH / *AqCua*® CS98-FEED
Act No. 36 of 1947 Registration number : B2549 (TECH) / V10929 (FEED)
Substance name : Copper sulphate pentahydrate
Synonyms : Cupric sulphate pentahydrate; copper sulphate (II) pentahydrate;
blue vitriol; blue stone

1.2 Relevant identified uses of the substance or mixture and restrictions on use

Relevant identified uses

Agriculture (soil additive, pesticides, Bordeaux mixture), feed additive, biocides, textile mordant, leather industry, pigments, electric batteries, electroplated coatings, copper salts, reagent in analytical chemistry, medicine, pulp wood and ground pulp preservative, process engraving and lithography, ore floatation, petroleum industry, synthetic rubber, steel manufacturing, treatment of natural asphalts, adsorbents and pH regulators in water treatment process.

Restrictions on use

Avoid release into the environment; use personal protective equipment.

1.3 Details of the supplier of the safety data sheet

Company : Kimleigh Chemicals SA (Pty) Ltd
Address : 11 Jasper van der Westhuizen Street, Potchindustria, Potchefstroom 2531, North West
province, South Africa
Telephone : +27 18 293 1028; +27 18 285 1014
E-mail address : sheq@kimleigh.co.za

1.4 Emergency telephone number

Emergency phone number: +27 18 293 1028; +27 18 285 1014

Monday to Thursday from 7:00 a.m. to 5:00 p.m.; Friday from 7:00 a.m. to 14:00 p.m.

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SECTION 2: Hazards identification




2.1 Classification of the substance or mixture

Classification according to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) Rev.9 and Regulation (EC) No 1272/2008

GHS Hazard class	GHS Hazard category	GHS Hazard statement codes
Acute toxicity (Oral)	4	H302
Serious eye damage / irritation	1	H318
Hazardous to the aquatic environment, short-term (Acute)	1	H400
Hazardous to the aquatic environment, long-term (Chronic)	1	H410

2.2 Label elements

Labelling according to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) Rev.9 and Regulation (EC) No 1272/2008

Pictogram(s)			
Signal word(s)	Danger		

Hazard statement(s)

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

Precautionary statement(s)

P264 + P265 : Wash hands thoroughly after handling. Do not touch eyes.
P270 : Do not eat, drink or smoke when using this product.
P273 : Avoid release to the environment.
P280 : Wear protective gloves / protective clothing / eye protection / face protection / hearing protection.
P301 + P317 + P330 : IF SWALLOWED: rinse mouth and get medical help.
P305 + P317 + P338 + P354 : IF IN EYES: immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical help.
P501 : Dispose of contents/container in accordance with national regulations.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

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Product range: *AqCua*[®]

SECTION 3: Composition / Information on ingredients

3.1 Substances

Chemical identity (IUPAC / CAS name)	: Copper (2+) sulphate pentahydrate; sulphuric acid copper (2+) salt (1:1), hydrate (1:5)
Common name	: Copper sulphate pentahydrate
Synonyms	: Cupric sulphate pentahydrate; copper sulphate (II) pentahydrate; blue vitriol; blue stone
Formula	: $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$; $\text{CuH}_{10}\text{O}_9\text{S}$
Molecular weight	: 249.685 g/mol
Appearance	: Bright blue triclinic crystals, odourless, hygroscopic
Purity	: ≥ 98 % w/w as copper sulphate pentahydrate, corresponding to ≥ 25 % total copper

Compound	Concentration	CAS No.	EC No.	Index No.
Copper sulphate pentahydrate	≤ 100 %	7758-99-8	231-847-6	029-004-00-0; 029-023-00-4

SECTION 4: First-aid measures

4.1 Description of first-aid measures

General advice

Consult a physician in case of emergency. Show this safety data sheet to the doctor in attendance.

If inhaled

Following inhalation, move the affected person to fresh air.

In case of skin contact

In case of contact, immediately rinse skin with copious amounts of cold water, while removing contaminated clothes and shoes. Cover the irritated skin with an emollient. Wash exposed clothing and shoes before reuse. Get medical attention immediately.

In case of eye contact

In case of contact, remove any contact lenses and rinse eyes with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

If swallowed

Following ingestion, rinse mouth with copious amounts of water. Seek immediate medical attention. Do not induce vomiting unless directed otherwise by a medical practitioner. Never administer anything by mouth to an unconscious person.

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4.2 Most important symptoms and effects, both acute and delayed

If inhaled

Coughing; sore throat

In case of skin contact

Redness; pain

In case of eye contact

Causes serious eye damage; redness; pain; visual disturbances such as blurred vision.

If swallowed

Stomach pain; burning sensation in mouth; diarrhoea; nausea, vomiting, shock.

4.3 Indication of any immediate medical attention and special treatment needed

Physician should treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use dry chemicals, carbon dioxide (CO₂), alcohol-resistant foam, water spray or fog. The product is non-combustible.

Unsuitable extinguishing media

No limitations on extinguishing agents are available.

5.2 Special hazards arising from the substance or mixture

Produces oxides of sulphur and copper on combustion or thermal decomposition.

5.3 Special PPE and precautions for firefighters

In the event of fire, wear positive-pressure self-contained breathing apparatus and appropriate protective clothing. Control fire extinguishing water from contaminating surface and ground water reservoirs by containing and keeping the run-off water separate.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Wear respiratory protection. Avoid dust formation. Avoid inhalation of dust, vapours, mist or gas. Ensure adequate ventilation. Avoid contact with skin and eyes. Evacuate personnel to safe areas.

For personal protection, please see section 8.

6.2 Environmental precautions

Avoid release into the environment. Do not discharge into drains, sewage systems or onto the ground. Avoid spillage or run-off entering drains, sewage systems or watercourses. Immediately report uncontrolled spillage or discharges to an appropriate regulatory body.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect dry powder using a special dust vacuum cleaner or carefully sweep into suitable waste disposal container and seal securely. Avoid generating dust. Label the container appropriately and remove from the area as soon as possible.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Handle with care. Do not swallow or inhale dust, spray, mist or vapours. Avoid contact with eyes, skin and any form of ingestion. Avoid the formation of dust and aerosols. Wear suitable protective clothing such as overalls, boots, rubber gloves, safety goggles, nose and mouth protection. Wash contaminated clothing daily. Provide appropriate ventilation where dust formation might occur. If skin or eye contact occurs, wash thoroughly with water.

Do not eat, drink or smoke when using this substance. Avoid contamination of food, foodstuffs, eating utensils and drinking water by washing-up before entering eating areas. Do not discharge product residues into the environment.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Store in an airtight container in a cool, dry and well-ventilated place. Keep away from food, foodstuffs, incompatible substances, steel structures or steel components.

Store only in sealed polypropylene or stainless-steel containers. Minimize dust generation and accumulation, and store away from direct sunlight and heat.

Air sensitive; hygroscopic; handle and store under inert gas.

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Product range: *AqCua*®

Storage class (TRGS 510) : Non-Combustible Solids

SECTION 8: Exposure controls / Personal protection

8.1 Control parameters

Occupational exposure limits (OEL)

European Agency for Safety and Health at Work : The legal airborne permissible exposure limit (PEL) is 1 mg/m³ (OSHA) (TWA over 8 hours) for copper dusts and mists, and 0.1 mg/m³ for copper fumes.

NIOSH (TWA over 10 hours) : The recommended airborne exposure limit (REL) is 1 mg/m³ for copper dusts and mists, and 0.1 mg/m³ for copper fumes.

ACGIH (TWA over 8 hours) : The threshold limit value (TLV) is 1 mg/m³ for copper dusts and mists, and 0.2 mg/m³ for copper fumes.

GN 1179 of 25 August 1995: Hazardous chemical substances regulations, Government Gazette, RSA. : The threshold weighted average (TWA) is 1 mg/m³ for copper dusts and mists, 0.2 mg/m³ for copper fumes, and 2 mg/m³ for copper dusts and mists according to the short-term OEL-RL.

8.2 Appropriate engineering controls

Provide adequate general and local exhaust ventilation to ensure that the airborne levels remain below the recommended exposure limits. Mechanical ventilation should be used if dust formation occurs. Avoid contact with eyes, skin and clothing. Wash hands immediately after handling the product. Comply with good industrial hygiene practices. Provide an eyewash station and a safety shower in case of emergency.

8.3 Personal protective equipment

Eye/Face protection : Use a face shield and tightly fitting safety goggles as equipment for eye/face protection that are approved under appropriate governmental standards such as NIOSH (US) or EN 166 (EU).

Skin protection : Wear nitrile rubber gloves when handling the substance. Gloves must be inspected prior to use and properly removed after handling this substance, to prevent skin contact. Dispose of contaminated gloves after use in accordance with applicable regulatory guidelines and good laboratory practices. Wash and dry hands. Wear safety boots as well.
Recommendations for gloves:
Nitrile rubber; thickness > 0.11 mm; breakthrough time > 480 minutes.

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- Body protection : Use a full acid resistant suit protecting against chemicals.
- Respiratory protection : Wear an appropriate dust respirator when ventilation is inadequate. Use a full-face particle respirator fitted with an N99 (US) or type P2 (EN 143) filter cartridge.
- Thermal hazard : Not applicable.
- Control of environmental exposure : Do not let the substance enter drains or sewage systems and prevent leakages or spillage or any form of discharge into the environment. Do not allow the substance to contaminate ground water systems.

SECTION 9: Physical and chemical properties

- Physical state : Hygroscopic powder, granules, or crystals.
- Colour : Blue
- Odour : Odourless
- pH : 3.7 – 4.5 (acidic) at 50 g/L at 25 °C
- Melting point/freezing point : The substance decomposes at temperatures exceeding 110 °C, before melting. It loses two water molecules at 30 °C, two more at 110 °C and the final water molecule at 250 °C.
- Initial boiling point and boiling range : Not applicable. The substance decomposes at temperatures exceeding 110 °C.
- Flammability : Non-flammable
- Lower and upper explosion limit / flammability limit : No data available.
- Flash point : Not applicable. The substance is an inorganic solid.
- Auto-ignition temperature : No data available.
- Decomposition temperature : 110 °C
- Kinematic viscosity : Not applicable. Substance is in crystal form.
- Solubility : Soluble in water at 220 g/L at 25 °C.
- Partition coefficient (n-octanol/water) : Not applicable. Substance is inorganic.
- Vapour pressure : 7.3 mm Hg at 25 °C
- Density (bulk, uncompact) : 1.161 kg/m³ at 20 °C
- Relative vapour density : Not applicable. Substance is a solid.
- Particle characteristics : 3 mm particle size.

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SECTION 10: Stability and reactivity

10.1 Reactivity

Substance is hygroscopic.

10.2 Chemical stability

The substance is chemically stable under standard ambient conditions (room temperature). No decomposition will occur if the substance is used and stored according to specifications.

10.3 Possibility of hazardous reactions

The substance is acidic when dissolved in water and can react with magnesium to form hydrogen gas. It can have an exothermic reaction with strong oxidizing agents such as magnesium and hydroxylamine, forming toxic sulphur dioxide fumes.

10.4 Conditions to avoid

Exposure to moisture and heat. Avoid dust generation. Store away from oxidizing agents, strong bases.

10.5 Incompatible materials

Avoid contact with strong alkalis. Acetylene; hydroxylamine; magnesium; potassium chlorate and oxidising agents. Avoid contact with steel.

10.6 Hazardous decomposition products

Toxic sulphurous oxides and copper oxides; copper fumes and carbon oxides.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Classification according to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) Rev.9, The National Institute for Occupational Safety and Health (NIOSH) and Regulation (EC) No 1272/2008

Acute toxicity:

Route of exposure	Dose / concentration; test subject	Numerical measures	ATE Actual / Converted
Ingestion (oral)	LD ₅₀ ; rat	481 - 482 mg/kg bw	500 mg/kg bw
Inhalation	Data not available	Data not available	Data not available
Dermal	LD ₅₀ ; rat	> 2000 mg/kg bw	2500 mg/kg bw

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Product range: *AqCua*®

Skin corrosion / irritation:

Rabbit intact skin – 0.5 g (4 hours and 7 days post-exposure)

Result – Slight erythema and no oedema; therefore, not a skin irritant.

OECD Test Guideline 404

Serious eye damage / eye irritation:

Rabbit eyes – 100 mg (21 days post-exposure)

Result – Corneal opacity, iritis, conjunctive redness, chemosis and irreversible ocular lesions; therefore, severe eye irritant.

OECD Test Guideline 405

Respiratory or skin sensitization:

No data available for respiratory sensitization.

For skin sensitization:

Guinea pig maximisation test: intradermal injection of 0.1 % (w/w) on day 1; topical application of 10 % (w/w) on day 8 and 10 % (w/w) on day 22.

Result – Negative; therefore, not sensitizing.

OECD Test Guideline 406

Germ cell mutagenicity:

The Ames test *in vitro* using *Salmonella typhimurium*

Result – Negative; therefore, no mutagenicity.

OECD Test Guideline 471

Bone marrow micronucleus assay: Mice oral gavage with 447 mg/kg (2 days exposure)

Result – Negative; therefore, no mutagenicity.

OECD Test Guideline 474

Carcinogenicity:

Rat feeding studies – 530 and 1600 ppm copper (44-week exposures)

Result – Negative; therefore, no carcinogenicity.

Human studies were inconclusive for a direct link between copper exposure and cancer.

Reproductive toxicity:

Rat 2-generation study

Result – No effects on fertility and litter parameters.

OECD Test Guideline 416

Specific target organ toxicity (STOT) - single exposure:

The clinical signs of toxicity are transient in nature and considered unspecific for general target organ toxicity.

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Specific target organ toxicity (STOT) - repeated exposure:

No data is available for copper sulphate pentahydrate.

Aspiration hazard:

No data is available for copper sulphate pentahydrate.

11.2 Additional Information

No selective neurotoxic and immunotoxic effects are associated with this substance.

SECTION 12: Ecological information

12.1 Toxicity

Classification according to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) Rev.9, The National Institute for Occupational Safety and Health (NIOSH) and Regulation (EC) No 1272/2008

Type of toxicity	Dose / concentration administered	Numerical measures	References
Short-term (acute) aquatic hazard	LC ₅₀ in Fish	0.0081 mg/L/96h	ECHA, 2014
Long-term (chronic) aquatic hazard	EC ₅₀ in Algae	0.0074 mg/L/48h	ECHA, 2014

12.2 Persistence and degradability

This product contains heavy metals and its discharge into the environment should be avoided. It is not subject to rapid environmental transformation and is slowly degradable in the environment.

12.3 Bioaccumulative potential

Substance is inorganic and the bioaccumulative criteria is not applicable to essential metals. No octanol/water partition coefficient is available.

12.4 Mobility in soil

Seeing as this substance is readily water soluble, it can spread through the environment via water systems. It is highly mobile in soil and binds strongly to soil particles.

12.5 Other adverse effects

The key indicator of copper toxicity is disturbance of the sodium homeostasis. The key target tissue is the water / organism interface, with cell wall and gill-like surfaces acting as target biotic ligands. This substance does not contribute to ozone depletion, ozone formation, global warming or acidification.

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SECTION 13: Disposal considerations

The generation of waste should be restricted or minimized wherever possible. Copper sulphate pentahydrate is hazardous to the aquatic environment and any form of discharge or leakage into the environment, should be avoided. Do not dispose of this substance in the drain. Dispose of this substance in accordance with the regulations stipulated in the National Environmental Management Waste Act 2008 of South Africa.

SECTION 14: Transport information

	Land transport (UN TDG/ADR)	Sea transport (IMDG)	Air transport (IATA-DGR)
14.1 UN Number	3077	3077	3077
14.2 UN Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (includes AqCua [®] CS98-TECH Copper sulphate pentahydrate)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (includes AqCua [®] CS98-TECH Copper sulphate pentahydrate)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (includes AqCua [®] CS98-TECH Copper sulphate pentahydrate)
14.3 Transport hazard class(es)	9	9	9
14.4 Packing group	III	III	III
14.5 Environmental hazards	Yes	Yes, marine pollutant	Yes

14.6 Transport in bulk according to IMO instruments

Maritime transport in bulk is not intended.

14.7 Special precautions for user

Ensure that packaging remains intact. Dust formation should be restricted wherever possible.

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SECTION 15: Regulatory information

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

This material safety data sheet complies with the requirements stipulated in The Globally Harmonized System of Classification and Labelling of Chemicals (GHS), 9th revised edition, United Nations: New York and Geneva, 2021.

National legislation

Occupational Health and Safety Act, 1993 - Hazardous Chemical Agent Regulations 2021.

Other regulations

European Agency for Safety and Health at Work (OSHA) guidelines.

The National Institute for Occupational Safety and Health (NIOSH) guidelines.

15.2 Chemical Safety Assessment

No chemical safety assessment was carried out for this substance.

SECTION 16: Other information

List of abbreviations

ACGIH	: The American Conference of Governmental Industrial Hygienists
ADR	: European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	: Acute Toxicity Estimate
bw	: Body weight
CAS	: Chemical Abstracts Service
CLH	: Harmonised classification and labelling
CLP	: Classification, labelling and packaging
DGR	: Dangerous Goods Regulations
EC	: European Community
EC ₅₀	: 50% of maximal Effective Concentration
ECHA – RAC	: The European Chemicals Agency – Risk Assessment Committee
EN	: European Nations
EU	: European Union
GHS	: Globally Harmonised System of Classification and Labelling of Chemicals
GN	: Government Notice
IATA	: International Air Transport Association
IMDG	: International Maritime Dangerous Goods
IMO	: International Maritime Organization
IUPAC	: International Union of Pure and Applied Chemistry

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LC ₅₀	: Lethal Concentration to 50% of a test population
LD ₅₀	: Lethal Dose to 50% of a test population (Median Lethal Dose)
NIOSH	: The National Institute for Occupational Safety and Health
OECD	: Organisation for Economic Co-operation and Development
OEL	: Occupational exposure limit
OEL-RL	: Occupational exposure limit – recommended limit
OSHA	: The Occupational Safety and Health Administration
PBT	: Persistent, bioaccumulative and toxic
PEL	: Permissible exposure limit
PPE	: Personal protective equipment
REL	: Recommended airborne exposure limit
RSA	: Republic of South Africa
STOT	: Specific target organ toxicity
TDG	: Transport of Dangerous Goods
TLV	: Threshold limit value
TRGS	: Technical Rules for Hazardous Substances
TWA	: Threshold weighted average
UN	: United Nations
US	: United States
vPvB	: Very persistent and very bioaccumulative

References

ECHA. 2014. Committee for Risk Assessment RAC Annex 1 Background document to the Opinion proposing harmonised classification and labelling at Community level of Copper sulphate pentahydrate. CLH-O-0000001412-86-33/F. Available at: <https://echa.europa.eu/documents/10162/df7a9984-2cd0-ba61-524c-ac6e338fb787>. (Accessed: 13.07.2022).

GHS. 2021. The Globally Harmonized System of Classification and Labelling of Chemicals (GHS), 9th revised edition, United Nations: New York and Geneva. p. 550.

Disclaimer:

KIMLEIGH CHEMICALS SA (Pty) Ltd provides the information contained herein in good faith but does not assume any liability whatsoever for its accuracy or completeness. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist. The information contained in this Safety Data Sheet only relates to the specific designated material and is not valid for other derivatives of this material, unless stated otherwise.

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