BÜCHI Labortechnik AG

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BUCHI Certificate of Analysis (CoA)

Product Characteristics

Product:	Kjeldahl Tablets Titanium
Order code:	11072627
LOT no.:	04110624
Production date:	11.06.2024
Expiration date:	11.06.2029

Testing Results

Parameter	Specification	Measured value
Appearance	Round white with green/blue speckled flat tablets	Complies
Potassium sulfate	3.50 g/tablet	3.50 g/tablet
Copper sulfate pentahydrate	0.105 g/tablet	0.105 g/tablet
Titanium dioxide	0.105 g/tablet	0.105 g/tablet
Weight uniformity	3.71 ± 0.2 g	3.70 ± 0.07 g
Friability	≥ 100 N/mm^2	266 ± 60 N/mm^2
Nitrogen	≤ 12 ppm	≤ 7 ppm

Storage:	Room temperature, keep dry and tightly closed in well-ventilated rooms.
Certificate issue date:	24.06.2024

This certificate is electronically generated and does not require a signature.

SECTION 1: Identification of the substance/mixture and of the company /undertaking

1.1. Product identifier

1.1.1. Trade name **Kjeldahl tablets Titanium**

1.1.2. Article number **11072627**

1.1.3. Unique Formula Identifier (UFI)

UFI: D600-604T-P00S-52EF

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

1.2.1. Relevant identified uses

1.2.1.1. Use descriptor category

Use descriptor category:

Life cycle stage (LCS)	PW: Widespread use by professional workers
Sector of use	SU24: Scientific research and development (analytical chemistry)
Technical function	fine chemical

1.2.1.2. European product categorisation system (EuPCS)

EuPCS codes: PC-TEC-19 (Reagents and laboratory chemicals)

1.2.2. Uses advised against

not known

1.3. Details of the supplier of the safety data sheet

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Web: www.buchi.com

1.4. Emergency telephone number

Swiss Toxicological Information Centre:
in Switzerland: 145,
from abroad: +41 44 251 51 51 (24 h)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

2.1.1. Classification according to Regulation (EC) No 1272/2008 (CLP Regulation)

Eye Irrit. 2; H319,
Aquatic Acute 1; H400,
Aquatic Chronic 1; H410

2.2. Label elements

2.2.1. Labelling according to Regulation (EC) No 1272/2008 (CLP Regulation)

GHS07

GHS09

Signal word: WARNING

Hazard statements

H319	Causes serious eye irritation.
H410	Very toxic to aquatic life with long lasting effects.

Supplemental Hazard information (EU):

EUH212	Warning! Hazardous respirable dust may be formed when used. Do not breathe dust.

Precautionary statements

Prevention:

P264	Wash thoroughly after handling.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Reaction:

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.
P391	Collect spillage.

Disposal:

P501	Dispose of contents/container to local waste disposal company or to the manufacturer.

2.3. Other hazards

The mixture does not meet the criteria for classification as PBT or vPvB substance. The substances in the mixture were not included in the list established in accordance with article 59(1) for having endocrine disrupting properties. The substances are not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.
See also the sections 5, 6, 10, 11, 12, 15

SECTION 3: Composition/information on ingredients

3.1. Substances

The product is a mixture.

3.2. Mixtures

A mixture of potassium sulfate and small amounts of copper (II) sulfate pentahydrate and titanium (IV) oxide.

Chemical name	CAS No	EC No	REACH Registration No	% w/w	Classification according to Regulation (EC) No 1272/2008
potassium sulfate	7778-80-5	231-915-5	01-2119489441-34	≤ 94.34	not classified as hazardous
titanium (IV) oxide, titanium dioxide	13463-67-7	236-675-5	01-2119489379-17	≤ 2.83	not classified as hazardous in form of tablets[1)]

[1)] The classification of titanium dioxide as carcinogen by inhalation (Carc. 2, H351 (inhalation)) in Annex VI, Part 3, Table 3 of Regulation (EC) No. 1272/2008 applies only to mixtures in powder form containing 1% or more of titanium dioxide which is in the form of or incorporated in particles with aerodynamic diameter ≤ 10 µm (see Note 10 in Annex VI, Part 1, of the regulation).

3.2.1. Hazardous ingredients

Chemical name	CAS No	EC No	REACH Registration No	% w/w	Classification according to Regulation (EC) No 1272/2008 (Table 3 of Annex VI)
copper (II) sulfate pentahydrate	7758-99-8	231-847-6	01-2119520566-40	≤ 2.83 (1.81 Copper (II) sulfate)	Acute Tox.4; H302 Eye Dam. 1; H318 Aquatic Acute 1; H400 Aquatic Chronic 1; H410 M=10 M(chronic)=1 oral: ATE=481 mg/kg bw

3.3. Additional information
The text of H-Statements is given in section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

4.1.1. General informations
Consult doctor in case of pathological signs.

4.1.2. In case of eye contact
Rinse widely opened eye for several minutes (at least 10 min) under running water. Remove contact lenses. It is advisable to use an eyewash. Further treatment by an ophthalmologist.

4.1.3. In case of skin contact
Remove contaminated clothing immediately and wash affected areas with soap and water.

4.1.4. Following ingestion
Rinse mouth with water and call a doctor! Do not induce vomiting! Encourage to drink water in small sips (dilution effect).

4.1.5. Following inhalation
If inhaling abrasive dust remove victim to fresh air.

4.1.6. Self-protection of the First Aider
Avoid contact with substance still present.

4.2. Most important symptoms and effects, both acute and delayed
Vomiting, irritation of the respiratory tract.

4.3. Indication of any immediate medical attention and special treatment needed
Notify a contact with water-soluble copper compounds.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media:
water spray, foam, carbon dioxide or extinguishing powder

Unsuitable extinguishing media:
not known

5.2. Special hazards arising from the substance or mixture
In a fire corrosive sulfur oxides and hazardous vapors of metal oxides can be released.

5.3. Advice for firefighters
Product is non-combustible, fire-extinguishing measures are to be adapted to surrounding.
The extinguishing water should not enter the sewage system!

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Avoid formation of dust. Do not eat or drink when handling Kjeldahl tablets. Always wear gloves, goggles and protective clothing.

6.2. Environmental precautions

Product should not be discharged into drains or waterways.

6.3. Methods and material for containment and cleaning up

Take up mechanically, fill in corrosion-resistant containers and then dispose of it.

6.4. Reference to other sections

See sections 4, 7, 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Do not eat or drink when handling Kjeldahl tablets. Use protective gloves, goggles and protective clothing.

7.2. Conditions for safe storage, including any incompatibilities

Kjeldahl tablets should be stored dry in tightly closed containers, separate from foodstuffs, beverages and animal feedstocks.

Storage class: 13 (non-combustible solids) according to TRGS 510 (Storage of hazardous substances in nonstationary containers), Annex 4.

7.3. Specific end use(s)

For determination of nitrogen by the Kjeldahl method.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Potassium sulfate and titanium (IV) oxide:

General limit for dust (TRGS 900 (Technical Rules for Hazardous Substances)):

Inhalable fraction (I dust): 10 mg/m³ (TWA)

Respirable fraction (R dust): 1.25 mg/m³ (TWA)

Copper and its inorganic compounds:

The limit value of 0.01 mg/m³ (measured on the respirable fraction) is proposed by the MAK Commission of the German Research Foundation (DFG). The MAK value has no legal binding.

DNEL (systemic)
All figures are taken from REACH registration dossiers for potassium sulfate, titanium (IV) oxide and copper sulfate.

Route	Substance	Worker	General population
Inhalation (Long term exposure)	potassium sulfate	37.6 mg/m³	11.1 mg/m³
	titanium (IV) oxide	no hazard identified[1)]	
	copper in dust form copper in fume form	1 mg/m³ 0.1 mg/m³	no hazard identified
Dermal (Long term exposure)	potassium sulfate	21.3 mg/kg bw/day	12.8 mg/kg bw/day
	titanium (IV) oxide	no hazard identified	
	copper (dry) and copper compounds	137 mg/kg bw/day	no hazard identified
Oral (Long term exposure)	potassium sulfate	-	12.8 mg/kg bw/day
	titanium (IV) oxide	no hazard identified	
	copper in dissolved form	0.041 mg/kg bw/day	0.041 mg/kg bw/day

[1)] The classification of titanium dioxide as carcinogen by inhalation (Carc. 2, H351 (inhalation)) in Annex VI, Part 3, Table 3 of Regulation (EC) No. 1272/2008 applies only to mixtures in powder form containing 1% or more of titanium dioxide which is in the form of or incorporated in particles with aerodynamic diameter ≤ 10 µm (see Note 10 in Annex VI, Part 1, of the regulation).

PNEC

All figures are taken from REACH registration dossiers for potassium sulfate, titanium (IV) oxide and copper sulfate.

Substance	potassium sulfate	titanium (IV) oxide	copper in dissolved form
Freshwater	0.68 mg/l	no hazard identified	7.8 µg/l
Seawater	0.068 mg/l		5.2 µg/l
Sediment (Freshwater)	not sufficiently accurate data available		87 mg/kg sediment dw
Sediment (Seawater)	not sufficiently accurate data available		676 mg/kg sediment dw
Soil	not sufficiently accurate data available		65 mg/kg soil dw

8.2. Exposure controls

Ensure good ventilation. Avoid formation of dust.

8.2.1. Personal protective equipment

8.2.1.1. Eye / Face protection

Safety glasses required.

8.2.1.2. Respiratory protection

Required when occurrence of dusts (particle filter P2 according to DIN 3181).

8.2.1.3. Skin protection

Chemical protective gloves, e.g. consisting of nitrile rubber (check for damage before use), penetration time (value for permeation: Level 6, > 480 min, EN 374)

8.2.2. General health and safety measures

Avoid unnecessary contact with the product.
Wash hands after work, change contaminated clothing.
While using do not eat, drink or smoke.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Property	Value/Description
Physical state	solid (tablets)
Weight	3.71 g
Colour	white-blue
Odour	odourless
Melting point/freezing point	not determined
Boiling point or initial boiling point and boiling range	not determined
Flammability	not applicable, since mixture of solids
Lower and upper explosion limit	see the comments on flammability
Flash point	not applicable, since mixture of inorganic solids
Auto-ignition temperature	not applicable, since mixture of inorganic solids
Decomposition temperature	> 560 °C (Cooper sulfate)
pH	4.35 (at 50 g/l H_2O) at 20 °C
Kinematic viscosity	not applicable, since mixture of inorganic solids
Solubility	111 g/l H_2O at 20 °C (Residue of titanium (IV) oxide)
Partition coefficient n-octanol/water (log value)	not applicable, since mixture of inorganic solids
Vapour pressure	< 10^{-1} Pa at 20 °C
Density and/or relative density	2.7 g/cm^3 at 20 °C

Bulk density	1349 kg/m³ at 20 °C
Relativ vapour density	Not applicable, since vapour pressure too low
Particle characteristics	not relevant because pressed tablets are present

9.2. Other information
Other physical and chemical properties have not been determined.

SECTION 10: Stability and reactivity
10.1. Reactivity
No specific reactivity.
10.2. Chemical stability
No decomposition when used and stored as intended.
10.3. Possibility of hazardous reactions
Not known
10.4. Conditions to avoid
The contact with moisture.
10.5. Incompatible materials
Alkalis and corrosion sensitive metals.
10.6. Hazardous decomposition products
If the product is overheated or in a fire corrosive sulfur oxides and vapors of metal oxides hazardous to health can be released.

SECTION 11: Toxicological information
11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008
No toxicological data available for the mixture.
11.1.1. Acute toxicity
All figures are taken from REACH registration dossiers for potassium sulfate, titanium (IV) oxide and copper sulfate.
Acute oral toxicity
Potassium sulfate: LD_{50} (rat) > 2000 mg/kg bw (OECD Test guideline 425)
Titanium (IV) oxide: LD_{50} (rat) > 5000 mg/kg bw (OECD Test guideline 420)
Copper (II) sulfate: LD_{50} (rat): 481 mg/kg bw (OECD Test guideline 401)
Acute dermal toxicity
Potassium sulfate: LD_{50} (rat) > 2000 mg/kg bw (OECD Test guideline 402)
Copper (II) sulfate: LD_{50} (rat) > 2000 mg/kg bw (OECD Test guideline 402 and EPA OTS 789.1100)
Acute inhalation toxicity
Potassium sulfate: LC_0 (rat): 3.6 mg/m3/4h (OECD Test guideline 433 draft), read across to Ammonium sulfate
11.1.2. Skin corrosion/irritation
The product can cause skin irritations. But the effect does not meet the criteria for classification.
11.1.3. Serious eye damage/irritation
The product can cause eye damage.
11.1.4. Respiratory or skin sensitisation
Not known.
11.1.5. Germ cell mutagenicity
Not known.
11.1.6. Carcinogenicity
Not known.
11.1.7. Reproductive toxicity
Not known.

11.1.8. Specific target organ toxicity (single exposure)
Not known.
11.1.9. Specific target organ toxicity (repeated exposure)
Not known.
11.1.10. Aspiration hazard
Not known.
11.2. Information on other hazards
There are no indications on other hazards.

SECTION 12: Ecological information
12.1. Toxicity
12.1.1. Acute aquatic toxicity
All figures are taken from REACH registration dossiers for potassium sulfate and copper sulfate.
Toxicity to fish
Potassium sulfate
LC_{50} (*Pimephales promelas*, 96 h): 680 mg/l (Test guidelines EPA/600/4-90/027 and EPA/600/6-91/003)
Copper sulfate
LC_{50} (*Oncorhynchus mykiss,* 96 h): 190 - 210 µg dissolved copper /l
LC_{50} (*Pimephales promelas*, 96 h): 390 µg dissolved copper /l
Toxicity to daphnia
Potassium sulfate
EC_{50} (*Daphnia magna,* 48 h): 720 mg/l (Test guidelines EPA/600/4-90/027 and EPA/600/6-91/003)
Copper sulfate
EC_{50} (*Daphnia magna*, 48 h): 33.8 - 792 µg/l (OECD Test guideline 202, determined in water of different hardness and pH values of 6.1 and 7.35)
Toxicity to algae
Potassium sulfate
EC_{50} (*Chlorella vulgaris*, 18 d): 2700 mg/l (read-across to Ammonium sulfate)
Copper sulfate
EC_{r50} (*Chlamydomonas reinhardtii, 96* h): 0.047 mg dissolved copper /l (Growth rate) (OECD Test guideline 201)
12.1.2. Chronic aquatic toxicity
All figures are taken from REACH registration dossier for copper sulfate.
Copper sulfate
NOEC (*Chlamydomonas reinhardtii,* 10 d): 0.022 mg dissolved copper/l (Growth rate) (OECD Test guideline 201)
12.2. Persistence and degradability
Copper is not degraded in soil and water sediments, but is enriched by adsorption.
12.3. Bioaccumulative potential
Since copper is not biodegradable, it is accumulated in the soil. The bioconcentration factor (BCF) obtained for a variety of plants is in the range of 1 and below.
12.4. Mobility in soil
Potassium sulfate has a high mobility due to its good solubility in water.
Titanium (IV) oxide has a low mobility and remains long in soil due to its low solubility in water.
Copper (II) sulfate has a high solubility in water, but it is adsorbed by the soil and it is subsequently immobilized.

12.5. Results of PBT and vPvB assessment
Not applicable to inorganic substances.
12.6. Endocrine disrupting properties
The substances in the mixture were not included in the list established in accordance with article 59(1) for having endocrine disrupting properties. The substances are not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.
12.7. Other adverse effects
Not known

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Product residues and the packaging must be disposed in accordance with the Waste Directive 2008/98/EC and national and regional regulations.
The revised list of waste pursuant to article 7 of the Directive was published with the Commission's Decision 2014/955/EU.
Product
Waste key:
06 03 13* (solid salts and solutions containing heavy metals)
Packaging
Contaminated packaging should be disposed of like the product.
Waste key:
15 01 10* (packaging containing residues of or contaminated with hazardous substances).

SECTION 14: Transport information

14.1. UN number or ID number
UN3077
14.2. UN proper shipping name
ADR/RID/ADN:
ENVIRONMENTALLY HAZARDOUS SUBSTANCE; SOLID, N.O.S., (Copper(II) sulfate)
IMDG-Code:
ENVIRONMENTALLY HAZARDOUS SUBSTANCE; SOLID, N.O.S., (Copper(II) sulfate)
ICAO-TI/IATA-DGR:
Environmentally hazardous substance, solid, n.o.s., (Copper(II) sulfate)
14.3. Transport hazard class(es)
9 (Miscellaneous dangerous substances and articles, including environmentally hazardous substances)

Road or rail transport takes place in limited quantities (LQ) in accordance with Chapter 3.4 of the ADR / RID Convention (application of special provision 375).

14.4. Packing group
III (Substances presenting low danger)
14.5. Environmental hazards
Environmentally hazardous substance:
ADR/RID/ADN/IMDG-Code: no
ICAO-TI/IATA-DGR: no
This marking applies to all transport routes for transport in limited quantities (LQ).
14.6. Special precautions for user
See Sections 6 - 8
14.7. Maritime transport in bulk according to IMO instruments
Does not apply, it is a solid product and not a bulk good.
14.8. Additional information
ADR Tunnel restriction code (-)
The passage through all tunnels is allowed.

SECTION 15: Regulatory information
15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
15.1.1. EU regulations
Safety Data Sheet:
Regulation (EC) No 1907/2006 (REACH), Annex II (SDS) amended by Regulation (EU) 2020/878.
Classification and labelling:
Regulation (EC) No 1272/2008 (CLP (EU-GHS) Regulation)
Seveso III
Directive 2012/18/EU
Kjeldahl tablets Titanium: E1 Hazardous to the aquatic environment, hazard category Acute 1 and Chronic 1
15.1.2. Basic national regulations (Germany)
Act for the protection of young people at work (JArbSchG)
Observe employment restrictions according to § 22 for teens.
Act for the protection of mothers at work, in education and in study (MuSchG)
Inadmissible activities and working conditions according to §§ 11 and 12 MuSchG for expectant and nursing mothers.
Act on protection against hazardous substances (Chemicals Act (ChemG))
Regulation on protection against hazardous substances (Hazardous Substances Regulation (GefStoffV))
Regulation on bans and restrictions on the marketing and delivery of certain substances, mixtures and products pursuant to the Chemicals Act (ChemVerbotsV)
Ordinance on facilities for handling substances that are hazardous to water (AwSV) of 18 April 2017.
Potassium sulfate (identification number: 255, see database Rigoletto): Water hazard class (WGK): 1 (slightly hazardous to water)
Titanium (IV) oxide (identification number: 1345, see database Rigoletto) – Water hazard class (WGK): non-hazardous to water (nwg)
Copper sulfate (identification number: 141, see database Rigoletto): Water hazard class (WGK): 3 (highly hazardous to water)
Water hazard class (WGK) of Kjeldahl tablets Titanium: 3 (highly hazardous to water)
(Derivation: mass fraction of copper sulfate (M factor: 10) ≥ 3%, see AwSV, Annex 1, section 5.2.1 Derivation of water hazard class 3)

15.2. Chemical Safety Assessment
For this product a chemical safety assessment was not created.

SECTION 16: Other information

16.1. Indication of changes

Header	- new logo
Subsection 3.2.	- addition of the symbol ≤ in the % w/w column
Subsection 16.3.	- update

16.2. Codes of the hazard classes and the hazard categories

a) Hazard classes and hazard categories in subsection 2.1.1.

Eye Irrit. 2	- Serious eye irritation, category 2
Aquatic Acute 1	- Hazardous to the aquatic environment, acute, category 1
Aquatic Chronic 1	- Hazardous to the aquatic environment, chronic, category 1

b) Hazard statements according to Regulation (EC) No 1272/2008, the text was not specified in section 3

H400 - Very toxic to aquatic life.
H410 - Very toxic to aquatic life with long lasting effects.
H302 - Harmful if swallowed.
H318 - Causes serious eye damage.

16.3. Literature and sources

Directives and Regulations

Regulation (EC) No 1907/2006 (REACH), was last amended by Regulation (EU) 2023/2482
CLP (EU-GHS) Regulation (EC) No 1272/2008, was last amended by Regulation (EU) 2024/197
Directive 2012/18/EU (Seveso III).

Copper compounds

Conclusion on the peer review of copper compounds, EFSA Scientific Report (2008)

Titanium dioxide

Guide on the classification and labelling of titanium dioxide, September 2021, ECHA

REACH registration dossiers

Copper (II) sulfate (REACH Registration No 01-2119520566-40)
Titanium (IV) oxide (REACH Registration No 01-2119489379-17)
Potassium sulfate (REACH Registration No 01-2119489441-34)

16.4. Methods in accordance with Chapter 2, Article 9 of Regulation (EC) No 1272/2008 for assessing the information that has been used for the purpose of classification

Aquatic toxicity: Use of tables 4.1.1 and 4.1.2 of Part I of Annex 4 of Regulation (EC) No 1272/2008.

16.5. Abbreviations and acronyms

ADN	Accord européen relatif au transport international des marchandises dangereuses par voie de navigation intérieure - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	Accord européen relatif au transport international des marchandises Dangereuses par Route - European arrangements about the international transport of dangerous goods on the streets.
ATE	Acute Toxicity Estimates
bw	body weight
CAS	Chemical Abstracts Service
CLP	Classification, Labelling, Packaging

DFG	German Research Foundation – Deutsche Forschungsgemeinschaft
DIN	German Institute for Standardization Incorporated Society – Deutsche Institut für Normung e. V.
DNEL	Derived No Effect Level
dw	dry weight
EC	European Community
EC	Effective Concentration
EC_r	Effective Concentration (Growth rate)
ECHA	European Chemicals Agency
EFSA	European Food Safety Authority
EN	European Standards
EPA	Environmental Protection Agency
EU	European Union
GHS	Globally Harmonized System of Classification, Labelling and Packaging of Chemicals
IATA-DGR	International Air Transport Association-Dangerous Goods Regulation
ICAO-TI	International Civil Aviation Organization - Technical Instructions
IMDG-Code	International Maritime Code for Dangerous Goods
IMO	International Maritime Organization
LC	Lethal Concentration
LD	Lethal Dose
MAK	Maximum Workplace Concentration - Maximale Arbeitsplatzkonzentration
NOEC	No Observed Effect level Concentration
N.O.S. (n.o.s.)	Not otherwise specified
OECD	Organisation for Economic Co-operation and Development (Organisation de coopération et de développement économiques, OCDE)
PBT	Persistent, Bioaccumulative, Toxic
PNEC	Predicted No Effect Concentration
REACH	Regulation, Evaluation and Authorization of Chemicals
RID	Règlement concernant le transport International ferroviaire de marchandises Dangereuses - Regulation for the international transport of dangerous goods in the rail transport.
TRGS	Technical Rules for Hazardous Substances
TWA	Time-Weighted Average
UN	United Nations
vPvB	very persistent and very bioaccumulative

16.6. Further information

This information is based on our present knowledge, they do not constitute an assurance of product properties and establishes no contract legal rights.