SAFETY INFORMATION SHEET

Slag, copper smelting

Safety Information Sheet based on REACH Regulation (EC 1907/2006), and CLP Regulation (EC1272/2008).

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

1.1 Product identifier

Name of Substance: Slag, copper smelting
Trade name: Iron silicate fines (Fayalite)

EC number:	266-968-3
EC name:	Slag, copper smelting
CAS number (EC inventory):	67711-92-6
Description:	Substance produced, from heterogeneous mixtures of copper contained material formed during the copper production, by reduction at high temperature in molten state (i.e. melting and processing in a furnace) or by flotation processes. Main constituents are iron silicate and calcium-aluminium silicates, with the amount of non-ferrous metals reduced to the lowest extent economically and technologically viable.
Registration number	01-2119513228-45-0008
Index number:	-

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

Slag, copper smelting does not meet the criteria for classification in accordance to the regulation (EC) 1272/2008. No safety measures are therefore needed for iron silicate.

During manufacturing and specific industrial uses, safety measures may however be needed due to the potential occurrence of fine dust. This Substance Information Sheet (SIS) therefore focuses on the safety data and safety measures of relevance to the industrial uses of iron silicate.

1.2.1 Relevant identified uses

Use Number	Use Description
M-1	Production of Copper slags
F-2	Formulation of cement, hydraulic binder, concrete, mortar, grout
F-3	Aggregate for manufacturing of hot mix asphalt
IS-1	Raw mix component for clinker production
IS-2	Raw mix component for iron/steel production
IS-3	Manufacture of slag construction material
IS-4	Manufacture of abrasive material
PW-0	Use of slags for stabilization of mining and quarries
PW-1	Use of slags for roofing
PW-2	Use of cement, hydraulic binder, concrete, mortar, grout, controlled low strength material
PW-3	Use of slags for construction (road, embankment)
PW-4	Use of slags as such or in asphalt for road construction
PW-5	Use of slags as abrasive agent
C-1	Consumer use of cement, hydraulic binder, concrete, mortar, grout, controlled low strength material
SL-1	Service life of slags in embankments
SL-2	Service life of slags in roofing
SL-3	Service life of slags in cement, hydraulic binder, concrete, mortar, grout
SL-4	Service life of slags in roads sublayer
SL-5	Service life of slags in roads top layer or as mix in -asphalt
SL-6	Service life of slags in mines
SL-7	Service life of slags in quarries

1.2.2. Uses advised against
There are no uses advised against.

1.3 Details of the supplier of the safety information sheet

Site	Address	Trade name
Aurubis Bulgaria AD	Aurubis Bulgaria AD Industrial zone 2070 Pirdop Bulgaria	Iron silicate fines Fayalite

e-mail address of competent person responsible for the SIS:

Environment, Health & Safety Department
Iuli Marinov, tel.: +359 728 6 2302
email: Iuli.Marinov@aurubis.com

1.4 Emergency telephone number

Aurubis Bulgaria AD, plant fire brigade, Tel. + +359 728 6 2255

SECTION 2: Hazards Identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 (CLP/GHS)
Not classified

2.2 Label elements

Labelling in accordance with the Classification Labelling and Packaging Regulation EC (no) 1272/2008
None

2.3 Other hazards

The substance does not meet the criteria for a PBT or vPvB substance.
There are no indications that the substance iron silicate would have endocrine disrupting properties.
Iron silicate is not expected to contribute to ozone depletion, ozone formation, global warming or acidification.

SECTION 3: Composition/information on ingredients

3.1 Substance

Name of Substance: Slag, copper smelting

Degree of purity: 100% (w/w) UVCB (substances of unknown or variable composition, complex reaction products or biological materials). For more information: see REACH guidance on “Identification and naming of substances under REACH”.

State/form: solid

Mineralogical composition:

Iron silicate fines: Iron silicate particles (79%) are the most common phase. Magnetite (20 %) is associated with these particles. These phases are coarse and largely intergrown and act as the host to the other phases, which typically appear as inclusions. Droplet inclusions consist mainly of copper sulfides (1 %)

Elemental composition:

Constituents	Typical concentration	Remarks
Cu	~ 0.4 % (w/w)	The copper content refers to elemental composition. Copper is mainly present as copper sulphides. These are droplet inclusions in the silicates.
Fe	~ 46 % (w/w)	The iron content refers to elemental composition. Iron is present as fayalite (Fe_2SiO_4) with accessory magnetite (Fe_3O_4) and iron silicate in amorphous glass (Si (Fe,Al,Ca)O2-3
Oxides	~ 32 % (w/w)	It refers to total content of Si, Al, Mg, Ca, calculated and reported as oxides. They are actually present in amorphous glass , other silicates and/or fayalite.
Zn	~ 1.5 % (w/w)	The zinc content refers to elemental composition. Zinc is mainly carried by sphalerite, fayalite and less by magnetite.
Pb	~ 0.2 % (w/w)	The lead content refers to elemental composition. Lead is completely included in the silicate phases
As	~ 0.05 % (w/w)	The arsenic content refers to elemental composition. Arsenic is completely included in the glass phase.
Ni	< 0.04 % (w/w)	The nickel content refers to elemental composition. Nickel is completely included in the silicate phases
Cd	< 0.003 % (w/w)	The cadmium content refers to elemental composition. Cadmium is completely included in the silicate phases.

3.2 Mixtures

Not applicable

SECTION 4: First Aid Measures

4.1 Description of first aid measures

Slag, copper smelting is not hazardous.
During some uses, the following hazardous derivatives may occur/be formed: hazardous fumes and dust.

General advice: Get medical attention if any discomfort develops. Show this information sheet to the doctor in attendance.

Following eye contact: Use general measures if eye irritations occur. Do not rub eyes. Ensure that contact lenses are removed before rinsing eyes. Flush eyes thoroughly with water, taking care to rinse under eyelids. Separate eyelids and wash the eyes thoroughly with water (15 min). Seek medical attention if irritation persists.

Following inhalation: In case of exposure to fumes, fine particulates, powders, flakes: move to fresh air, lay patient down, get medical attention if discomfort persists.

Following skin contact: Use general hygiene measures for contact with the material: wash with soap and warm water.

In case of contact with molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove molten product from skin because skin will tear easily.

Following ingestion: Rinse mouth thoroughly. Get medical attention if any discomfort continues.

4.2 Most important symptoms and effects, both acute and delayed

Not expected.

4.3 Indication of any immediate medical attention and special treatments needed

Treat symptomatically.

SECTION 5: Firefighting Measures

5.1 Extinguishing media

The product itself does not burn. Use firefighting measures appropriate to surrounding materials. Extinguishing media which may be used where molten material is present: sand, sodium chloride
Extinguishing media which shall not be used for safety reasons: No special requirements.

5.2 Special hazards arising from the substance or mixture

Inhalable dust.

5.3 Advice for fire fighters

Self-contained breathing apparatus with full-face piece. Dispose of fire debris and contaminated fire fighting media in accordance with official regulations.

SECTION 6: Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

Avoid formation of dust.
Ensure adequate ventilation.
Avoid inhalation of dust and fumes.
Wear suitable protective equipment.

6.1.2 For emergency responders

Avoid formation of dust.
Ensure adequate ventilation.
Avoid inhalation of dust and fumes.
Wear suitable protective equipment.
Keep unprotected persons away.

6.2 Environmental precautions

Liquids containing powder should be absorbed in vermiculite, dry sand, or earth before putting into a suitable container for recycling or disposal as hazardous waste.
Collect dust, particulates, powders, flakes using a vacuum cleaner with a HEPA filter. Place in a suitable container for recycling or disposal as hazardous waste.
Although the substance is not classified as dangerous to the environment, in the event of an accidental release the product should be prevented from reaching the sewage system or any water course, and from penetrating the ground/soil. Dispose of spilled material in accordance with the relevant local regulations. See Section 13 for disposal considerations.

6.3 Methods and materials for containment and clearing up

Avoid dust formation.
Sweep all spilled material or use an appropriate industrial vacuum cleaner.
Collect spilled material in suitable containers or closed plastic bags for recovery or disposal.
Dispose spilled material or contaminated material as waste. See section 13 for disposal considerations.

6.4 References to other sections
For more information on exposure controls/personal protection or disposal considerations, check Sections 8 to 13 of this Substance Information Sheet.

SECTION 7: Handling and Storage

7.1 Precautions for safe handling
Handle material in such a way, that distribution of dust is minimized. Use proper industrial hygiene. Do not inhale fumes or dust.

7.2 Conditions for safe storage, including any incompatibilities
No special precautions.

7.3 Specific end uses(s)
Check the identified uses in section 1.2 of this safety data sheet.

SECTION 8. Exposure Controls/Personal Protection

An overview of the assigned protection factors (APFs) of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE (www.ebrc.de/mease.html).

8.1 Control parameters

Country		**8 hours limit value** mg/m³	**Short term limit value** mg/m³	**Biological limit (blood) µg/dL (male – female)**
Bulgaria	Cu	0.1 vapour (8h TWA)		
	Pb	0.05 (8h TWA)		
	As	0.05 (8h TWA)		
Belgium (http://www.emploi.belgique.be/WorkArea/showcontent.aspx?id=23914)	Cu	0.2 fume 1 dust, mist		
	Pb	0.15		70 - 70
	As	0.01 inorganic compound		
	Cd	0,01 inhalable		
EU	Pb	0.15 inhalable		70 - 70
	Ag	0.01 total		
	Cd	0,001 inhalable (BOELV)		
Germany (ERB)	Cu	0.1 MAK, inhalable	0.2 inhalable	
	Pb	0.1 inhalable	0.6 inhalable 0.2 respirable	40 – 10 (suspended)
	As	0,0083 inhalable	0,066 inhalable	
	Ni	0,006 inhalable	0,048 inhalable	
	Sn	Sn^{2+} = 2 mg/m³; inhalable Sn^{4+} = 8 mg/m³, inhalable		
	Cd	0,001 inhalable	0,008 inhalable,15 min aver.	
United Kingdom (http://www.hse.gov.uk/pubns/books/eh40.htm)	Cu	0.2 fume 1 dust and mist	0.6 fume 2 dust, mist	
	Pb	0.15		60 - 30
	As	0.1		
	Sb	0.5		

PNECs and DNELs
The PNECs and DNELs of the elemental constituents apply. Not available for the substance.

PNEC for selected trace constituents of slag, copper smelting:

	Unit	**Cu**	**Pb**	**Ni**	**As**	**Cd**	**Zn**
Freshwater	µg/L	7.8	6.5	3.6	6.5	0.19	20.6
Reference		Cu CSR (2010)	Pb CSR (2010)	Ni CSR	Converted from As2O3 CSR	Cd CSR (2010)	Zn CSR

DNEL for selected trace constituents of slag, copper smelting:

	Target population	Cu	Pb	As	Ni	Cd
Inhalation (systemic, long term)	Worker	Internal DNEL 0.04075 mg/m³	OEL 0.05 – 0.15 mg/m³	OEL 0.01 – 0.05 mg/m³	0.05 mg/m³	0.004 mg/m³ (respirable fraction)
Biological monitoring	Worker	No needed	40 µg/dL blood (non-pregnant adults) 10 µg/dL blood (pregnant women)	BLV 0.9739 µg/dL blood 30 µg/dL creatinine in urine	Not assessed (indicative 1 µg/dL blood)	2 µg/dL creatinine in urine 0.5 µg/dL blood
Reference		Cu CSR (2010)	Pb CSR (2010) – RAR	WHO	Ni CSR	Cd CSR (2010); WHO

8.2 Exposure controls

See section 2.1 of the individual exposure scenarios in Annex I for a detailed description of the required exposure controls measures. Any control measures and associated efficiency values are based on actual measured data at the workplace or on the MEASE tool for occupational exposure assessment (http://www.ebrc.de/ebrc/ebrc-mease.php).

CRITICAL COMPONENTS THAT REQUIRE MONITORING AT THE WORKPLACE:
Copper, lead, arsenic, cadmium in accordance to the national legislation

The environmental assessment uses the Metal EUSES calculator for DUs can be freely downloaded from http://www.arche-consulting.be/Metal-CSA-toolbox/du-scaling-tool. For environmental monitoring, the physico-chemical characteristics of the local receiving environment should preferably be monitored (see section 12).

8.2.1 Appropriate engineering controls at industrial settings

Risk management measures, aiming at the protection of human health, are to be considered in cases of inhalation of dust and fumes (fumes from hot processes) during production and professional uses of copper slags
Prevent formation of dust where possible. Ensure appropriate ventilation/exhaustion at machinery and places where dust can be generated. For this reason, automated and closed systems should preferably be used for industrial and professional uses of copper slags. Use process enclosures, hoods at handling points, local exhaust ventilation or other engineering controls to keep airborne levels of containing metals below recommended exposure limits
Waste air is to be released into the atmosphere only when 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.

Risk management measures

Occupational exposure controls

Personal protection measures
Respiratory protection:
Use respiratory protection equipment to prevent from exposure of dust and fumes. Use local ventilation to keep levels below established threshold values. Respiratory protection is needed in case of inadequate ventilation or risk of inhalation of dust.
During tapping of slag use suitable respiratory equipment with particle filter (type P2).
During abrasive blasting with slag use breathing apparatus that is independent of circulating air.

Recommended:
- For normal operation and in case of short-term use: half-mask Filter P3
- In case of special operations with elevated exposure (cleaning, maintenance etc.): full-mask with combination filter A1E1B1-P3

Hand protection
Not classified as hazardous to skin (see section 11 for more details).
In case of handling at elevated temperature, wear heat-protective gloves (full leather).

Eye protection
Tightly sealed safety glasses.

Skin protection
Protective work clothing. referred to EN 13034, Type 6
In case of handling at elevated temperature wear protective work clothing referred to EN11612

SECTION 9: Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Property	Value
Physical state at 20°C and 101.3 kPa	Solid
Colour	Anthracite / grey-black
Odour	Odourless
Melting point / freezing point	1027-1341 °C
Boiling point or Initial boiling point and boiling range	Not applicable (high-melting solid)
Flammability	Non-flammable
Lower and upper explosion limit	Not applicable
Flash point	Not applicable (non-flammable solid)
Auto-ignition temperature	Not applicable
Decomposition temperature	Decomposition and/or melting starts at 1059°C
pH (at 20°C)	Not applicable to an inorganic solid.
Kinematic viscosity	Not applicable
Water solubility	Poorly soluble.
Partition coefficient n-octanol/water (log value)	Not applicable (inorganic substance)
Vapour pressure	Negligible
Density	4 g/cm³
Relative vapour density	Not applicable
Particle characteristics	Powder (D80 49µm , D50 21 µm)
Explosive properties	Not considered to be explosive
Oxidising properties	Not considered to be oxidising

9.2 Other information

None

SECTION 10: Stability and Reactivity

10.1 Reactivity

No reactive hazards known.

10.2 Chemical stability

Expected to be stable under normal conditions of use.

10.3 Possibility of hazardous reactions

No dangerous reactions known

10.4 Conditions to avoid

Avoid dust formation and contact with acids.

10.5 Incompatible materials

Strong acids.

10.6 Hazardous decomposition products

No decomposition if used as directed. Trace metals are firmly built in or bonded into the glass/crystal structures of the silicate and other mineral phases. Therefore, the release of metals soluble species is very limited.

SECTION 11: Toxicological Information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

The toxicological information was obtained from the Chemical Safety Report submitted as part the REACH registration (September 2019)

Toxicity	Description of effects
Effects	Derived based on CLP Mixture toxicity rules applied on constituents listed under Section 3, taking into account the forms present and assuming release of soluble, potentially bio-available ionic species as described in the section bio-accessibility.
Bio accessibility and read-across	The physical form (solid) and the physico-chemical properties (metal constituents present in mineral forms) limit the solubility of the constituents in biological fluids. Limited solubility results in limited potential for cellular absorption of the constituents. The toxicokinetics are therefore primarily related to the degree to which the metal mineral phases react with biological fluids and release soluble, potentially bio-available ionic species.
Oral (gastric) kinetics	Copper slag is a solid and needs to dissolve before it can be absorbed. Reduced absorption in gastrointestinal tract is therefore expected due to poor water solubility. To assess the potential availability of slags after oral intake, the metal release in human digestive system was estimated through in vitro bio-accessibility test in extraction solvent that resembles gastric fluid (using HCl 0.07N at pH 1.5) in accordance with the ASTM D 5517-07 standard (T. Brouwers (2019).). The fraction of metals that solubilize under these conditions can be considered as worst case determinant of bio-accessibility of metal constituents, because only solubility in the biological fluid is assessed and the absorption and homeostatic control mechanisms at the level of cells (eg intestine and liver) are ignored. Relative bio-accessibility of metals (amount of metal released/total amount of metal from representative slag sample compared to the solubility of reference soluble compound) is low: Cu 17%, Ni 8.6%, As 12%, Pb 8,8%, Co 17%
Inhalation kinetics	Copper slags in massive and granular forms do not contain inhalable particles (particles < 100 µm) and cannot be inhaled.
Dermal kinetics	Copper slag particles have to dissolve into the surface moisture of the skin before dermal uptake can begin. As the copper slag is poorly soluble in water it is not expected to partition to the epidermis. Therefore, dermal uptake is likely to be low. The solubility of Ni was assessed during an in-vitro bio- accessibility test in artificial sweat fluid in accordance with standardized test method (EN 1811). The amount of Ni released during the sweat tests of two copper slags is in the ranges between1.9 % to 2.5% or 0.021 and 0.036 µg Ni/cm2/week.
Acute toxicity	ORAL: Based on the available acute oral toxicity data (i. e LD50> 2000 mg/kg) and calculated Oral Acute toxicity estimate (ATE >2000 mg/kg) copper slag is not classified as hazardous for acute toxicity by the oral route. INHALATION: No test data on acute inhalation toxicity are available. The calculated Inhalation Acute toxicity estimate of the mixture is > 5mg/L thus copper slag is not classified as hazardous for acute toxicity by the inhalation route. Result is further confirmed by extrapolation from oral to inhalation route based on worst case 100% absorption rate. Using ATE oral: 2000 mg/kg BW and the extrapolation formula 1mg/kg BW = 0.0052 mg/L/4h, the inhalation ATE will be 10.4 mg/L/4h DERMAL: Consideration of available acute dermal toxicity data (i. e. LD_{50}>2000 mg/kg) leads to the conclusion that copper slag does not require classification for acute lethal effects. Copper slag is an inorganic solid poorly soluble in water. It is not likely to penetrate through skin in any significant quantity and so would therefore not cause any toxic effects following dermal exposure. Furthermore, negligible metal release in in-vitro bio-accessibility test in artificial sweat fluid was observed (0.021 to 0.036 µg Ni/cm2/week).
Skin/eye irritation/corrosion	Not irritating. In-vivo skin and eye irritation studies (Caballero and Alava, 2001) demonstrate that copper slag is non-irritant and therefore does not require classification for skin irritation/corrosion and eye irritation. Copper slag contains some minor ingredients classified as Skin Corrosive and/or Skin Irritant but these are all present at concentrations < 1%. Copper slag does not contain any constituents classified as Eye Dam.1. It contains some minor ingredients classified as Eye Irrit. 2 but these are all present at concentrations < 1%. Therefore, copper slag is not classified for skin corrosion, skin irritation and eye effects. Assessed by calculation: excel MECLAS tool (Verdonck; D'Havé (2010) in accordance to the EU CLP guidance (2009).

11.2 Information on other hazards

11.2.1. Endocrine disrupting properties

There are no indications that the substance copper would have endocrine disrupting properties.

SECTION 12: Ecological Information

The ecotoxicological information was obtained from Chemical Safety Report submitted as part the REACH registration (September 2019)

12.1 Toxicity

Environmental bioavailability

The uptake of copper slag by living organisms is related to the degree to which the metal mineral phases in the slag react with water / biological fluids and release soluble, potentially bio available ionic and other metal bearing species. Standardized (OECD) transformation/dissolution tests of copper slag were carried out to study its potential to release soluble available ionic and other metal-bearing species to the environment. Transformation / dissolution tests for 7 and 28 days at pH 6 (worst case) and loading of 100mg/L and 1 mg/l were performed on representative sample of iron silicate fines. (Rodriguez et al.,2010). The results demonstrate low releases of copper to the OECD media. Other metals lead, nickel, zinc, arsenic and cadmium were below the detection limits.

Acute fresh water toxicity

Reliable acute/short term toxicity data of copper slag are available for the three trophic levels (algae, Daphnia and fish). These studies show that the lowest L(E) C50 is > 100 mg/L and confirm that there is no need to classify copper slag for acute aquatic hazard:

- 96 h LC50 (fish) >100g/L (Sauerwald and Weiss, 2004)
- 48 h EC50 (Daphnia magna) 980mg/L to >6250 mg/L (Simon, 2011)
- 48 h EC50 (Daphnia magna) >100 g/L (Sauerwald and Weiss (2004)
- 72 h EC50 (P. Subcapitata) 155 mg/L to 965 mg/L (Wenzel, 2011)
- 72 h EC50 (N. Pelliculosa)1047 mg/L to >4474 mg/L (Wenzel, 2011)
- 72 h IC50 (algae) >100 g/L (Sauerwald and Weiss (2004)

The calculated classification based on transformation/dissolution data (Rodrigues 2010) and Toxic unit approach (Higher Tier MeClass Tool) resulted in No classification. Based on this result, the related criteria provided the estimated value for acute (short term) toxicity:

- 48 h EC50 (for crustacea) > 100 mg/L
- 96 h LC50 (for fish) > 100 mg/L
- 72 h ErC50 (for algae) > 100 mg/L

Chronic fresh water toxicity and PNEC derivation

A reliable study (De Schamphelaere, 2010) was performed which assessed the chronic toxicity of mesocosm water extracts of five slags on Brachionus calyciforus (rotifer). The 48 h EC10 for copper slag in the range of 94 mg/L to >672 mg/L.
The calculated classification based on transformation/dissolution data (Rodrigues 2010) and Toxic unit approach resulted (Higher Tier MeClass Tool) resulted in No chronic classification. Based on this result, the related criteria provided the estimated value for chronic (long term) toxicity to aquatic invertebrate (see EU CLP Annex I Table 4.1.0): NOEC (for crustacea) >1 mg/l.

Mesocosm study (Hommen et al, 2010) was performed to evaluate effects of iron silicate crushed stone fines and stones on algae, macrophytes, zooplankton and benthic macro invertebrates in outdoor mesocosms. The copper slag mesocosm study allows for the derivation of a reliable NOEC for the stones of 50 g slag/L and for the granules of 12.5 g slag/L. These values are used as a basis for the freshwater PNEC derivation. Additional weight of evidence for the mesocosm NOEC was obtained from read-across from metal-ion toxicity level, metal releases data for a range of slag materials and eco-toxicity data for a range of slag materials. The uncertainty analysis further demonstrates the quality and ecological relevance of the mesocosm NOEC. The NOEC from the mesocosm study are therefore carried forward as PNEC to the risk characterization without adding an additional uncertainty factor.

Chronic freshwater sediment toxicity test results and PNEC derivation:

Data on the effect of copper slag on sediment organisms is currently not available. Copper slag is complex metal containing substance. It mainly contains iron silicate like natural rocks which is ubiquitous in the environment and is found naturally in soil, water and sediment. Furthermore, copper slag is not classified as hazardous to aquatic environment. For metals uptake from water is believed to be the predominant route of exposure for aquatic organisms, it therefore expected that copper slag that is not hazardous to the aquatic environment will not be toxic to sediment organisms. The toxicity to sediment organisms will be influenced by the trace metals contained in the slag and the distribution of metals between the aqueous phase and sediment matter. PNEC sediment derived for different metals in the slag are available and hence used for risk characterization.

Chronic terrestrial toxicity test results and PNEC derivation:

Data on the effect of copper slag on sediment organisms is currently not available. Copper slag is complex metal containing substance. It mainly represents iron silicate like natural rocks which is ubiquitous in the environment and is found naturally in soil, water and sediment. Furthermore copper slag is not classified as hazardous to environment. The toxicity to terrestrial organisms will be influenced by the metals contained in the slag and the distribution of metals between the aqueous phase and soil matter. PNEC soil derived for different metals in the slag are available and hence used for risk characterization.

For more information on how the environmental classification was derived and how to assess bio-availability, contact your supplier.

12.2 Persistence and degradability

Not degraded in classic terms but geochemical cycling leads to removal of the metals from the system.

12.3 Bioaccumulative potential

Copper slag is a complex metal containing substance. It contains a range of trace metals which have a great variation in their physico-chemical and toxicological properties (Cu Pb, Zn, Ni). The assessment of bio-accumulation and secondary poisoning for the slag as a whole therefore has no meaning. Metals like Cu, Zn are essential and well-regulated in all living organisms and therefore the bio-accumulative criterion is not applicable.

12.4 Mobility in soil
Not applicable.

12.5 Results of PBT and vPvB assessment
The PBT and vPvB criteria in Annex XIII of the REACH Regulation do not apply to inorganic substances.

12.6 Endocrine disrupting properties
There are no indications that the substance copper would have endocrine disrupting properties.

12.7 Other adverse effects
No information available.

SECTION 13: Disposal Considerations

13.1 Waste treatment methods

Substance according to CLP is non-hazardous. At end-of-life, the material should preferably should be reused or recovered according to waste hierarchy (waste framework directive and national waste legislation).
Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility.

SECTION 14: Transport Information

		ADR/RID Land transport GGVS/GGVE (cross-border/domestic)	**IMDG/** GGV Sea Maritime transport	**IATA** DGR Air transport ICAO-TI
14.1	**UN number**	Not applicable	Not applicable	Not applicable
14.2	**UN proper shipping name**	Not applicable	Not applicable	Not applicable
14.3	**Transport hazard class(es)**	Not applicable	Not applicable	Not applicable
14.4	**Packing group**	Not applicable	Not applicable	Not applicable
14.5	**Environmental hazards**	Not applicable	Not applicable	Not applicable
	Vehicle placard	Not applicable	Not applicable	Not applicable
	Additional information	Not applicable	Not applicable	Not applicable
		Not applicable		

14.6. Special precautions for user
Not applicable.

14.7. Maritime transport in bulk according to IMO instruments
Not applicable.

SECTION 15: Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
No specific regulations on European level for the substance as such.

Standard and requirements for construction products:

Iron silicates comply with the EN harmonized standards for construction products

- EN 13242-1 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction
- EN 13043 Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas"
- EN 12620-1 Aggregates for concrete

Country-specific regulations need to be observed.

Other EC regulations
The product is not subject to identification regulations under EC Directives and the Ordinance on Hazardous Materials (GefStoffV - Germany).

German legislation:

Major Accident Ordinance / SEVESO: Not in scope

Technical Instructions on Air Quality Control (Technische Anleitung zur Reinhaltung der Luft – TA Luft)

Class	Amount in [%],
5.2.2/II	0.24
5.2.2/III	0,4
5.2.7.1.1/I	<0,1

Water hazard class (AwSV): Not hazardous for water.

15.2 Chemical Safety Assessment
A Chemical Safety Assessment has not been carried out for the substance.

SECTION 16: Other Information

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

List of Abbreviations

CAS	Chemical Abstracts Service
CLP	Classification, Labelling and Packaging Regulation [Regulation (EC) No.1272/2008]
DNEL	Derived No Effect Level
Dw	dry weight
EC	European Community
EC10	Effect concentration, 10%
GHS	Globally Harmonized System of Classification, Labelling and Packaging of Chemicals
LC50	Lethal Dose, 50%
LD50	Lethal Dose, 50%
LOAEC	Low observed adverse effects concentration
MEL	Minimal effect level
NOAEL	No observed adverse effect level
OEL	Occupational exposure limit
PNEC	Predicted No Effect Concentration
PBT	Persistent, bio-accumulative and toxic
TLV	Threshold limit value
TRGS	Technische Regeln für Gefahrstoffe (Technical Rules for Hazardous Substances)
TWA	Time-weighted average exposure
VME	Valeur Moyenne d'Exposition (Occupational Exposure Limit)
vPvB	Very persistent and very bio-accumulative

Revision information:
This the first version dated 17.11.2021.

Disclaimer:
This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. Furthermore, this safety data sheet (including its Annex) is made up based on the legal requirements as set by EC 1907/2006 (REACH) based on information as is available. Further information received following the time scale as foreseen by REACH and the guidance policies as described in the REACH Implementation Programs will be added when it becomes available.