IRON SILICATE

The substance is not classified as hazardous under the CLP Regulation (1272/2008/EC), is not persistent bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB) as defined in Annex XIII of the REACH Regulation, and is not included in the ECHA candidate list of substances of very high concern. Therefore provision of a Safety Data Sheet (SDS) is not mandatory. This Substance Information Sheet (SIS) is a voluntary presentation of certain information that may assist the user in the handling of the substance.

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

1.1 Product Identifier — Copper Slag

Product Name:	SCANGRIT®, Iron Silicate, Copper Slag
Product Description:	Iron Silicate
EINECS:	266-968-3
CAS:	67711-92-6
REACH Registration Number:	01-2119513228-45

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

Product use:	Blasting abrasive, Construction material, Grout, Colourant

1.3 Details of supplier of the substance information sheet

Scangrit, Eastfield Road, South Killingholme, Immingham, DN40 3NF, United Kingdom

Email address of person: sales@scangrit.co.uk (Dr. Gerry Bourke is responsible for this SIS)

1.4 Emergency telephone number of the supplier

Telephone number:	Phone +44 (0) 1469 574715 or Fax +44 (0) 1469 571644
Hours of Operation:	Office hours

SECTION 2: Hazards identification

2.1 Classification of substance or mixture

Classification according to Regulation (EC) No. 1272/2009 (CLP/GHS)

Classification: Not classified

2.2 Label Elements

Labeling according to Regulation (EC) No. 1272/2008

None

2.3 Other hazards

The substance does not meet the criteria for a PBT or a vPvB substance.

Use of this material may generate dust.

SECTION 3: Composition/information on ingredients

3.1

Substance	Concentration (w/w)	OEL	Remarks
Copper Slag EC: 266-968-3 CAS: 67711-92-6	100%	-	
Constituent	**Concentration (w/w)**	**OEL**	**Remarks**
Iron EC: 231-096-4 CAS: 7439-89-6	35-38%	-	The iron content refers to elemental composition. The iron is present as iron silicate in amorphous glass (Si (Fe,Al,Ca)$O_{2,3}$, fayalite (Fe_2SiO_4) with accessory magnetite (Fe_3O_4).
Oxides	42-44%	-	Refers to the total content of Si, Al, Mg, Mn, K, Na and Ba calculated and reported as oxides. They are actually present in amorphous glass and or augite (Ca,Mg,Al)SiO_6, and/or fayalite. The content of free silica is less than 0.3%
Copper EC: 231-159-6 CAS: 7440-50-8	0.5-0.9%	Yes	The copper content refers to elemental composition. Copper is present as elemental copper, copper sulphides, copper alloys and as inclusion/isomorphic substitution in silicates.
Zinc EC: 231-175-3 CAS: 7440-66-6	1-2%	-	The zinc content refers to elemental composition. Zinc is mainly carried by glass as zinc silicate, sphalerite ((Zn,Fe)S) and less by magnetite.
Impurities	**Concentration (w/w)**	**OEL**	**Remarks**
Lead EC: 231-100-4 CAS: 7439-92-1	0.01-0.04%*	Yes	The lead content refers to elemental composition. The lead is present mainly as galena (PbS).
Manganese EC: 231-105-1 CAS: 7439-96-5	<0.4%	Yes	The manganese content refers to elemental composition. The manganese is present in amorphous glass.
Chromium EC: 231-157-5 CAS: 7440.47-3	<0.3%	Yes	The chromium content refers to elemental composition. The chromium is present as Cr(III) oxide, there is no Cr(VI).
Nickel EC: 231-111-4 CAS: 7440-02-0	<0.04%	Yes	The nickel content refers to elemental composition. The nickel is present in metallic or alloy form.
Tin EC: 231-141-8 CAS: 7440-31-5	<0.09%	Yes	The tin content refers to elemental composition. The tin is incorporated in copper-tin alloys.
Arsenic EC: 231-148-6 CAS: 7440-38-2	<0.07%	Yes	The arsenic content refers to elemental composition. The arsenic is completely included in the glass phase.
Cobalt EC: 231-158-0 CAS: 7440-48-4	<0.05%	Yes	The cobalt content refers to elemental composition. The cobalt is incorporated in glass, in sulphides and/or alloys.
Cadmium EC: 231-152-8 CAS: 7440-43-9	<0.002%	Yes	

* The lead content applies to grades 2, 3 and 4. For other grades please refer to SIS Iron Silicate 2

SECTION 4: First aid measures

4.1 Description of first aid measures

Eye contact: Do not rub eyes. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

Skin contact:	Flush with water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
Ingestion:	Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities if water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

4.2 Most important symptoms and effects, both acute and delayed
The product may cause temporary mechanical irritation to the eyes, nose throat and lungs.

Indication of any immediate medical attention and special treatment needed
Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media:	Use an extinguishing agent appropriate to the surrounding materials.
Unsuitable extinguishing media:	No special requirements

5.2 Special Hazards arising from the substance or mixture

Hazards from the substance/mixture:	Inhalable dust

5.3 Advice for fire-fighters
Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

SECTION 6: Accidental release measures

6.1 Personal precautions
Ensure adequate ventilation. Avoid breathing dust. Use appropriate personal protective equipment.

6.2 Environmental precautions
Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

6.3 Methods and material for containment and clean up.
Ventilate the area thoroughly. Vacuum or sweep up material and place in suitable container for recycling or disposal.

6.4 References to other sections
Section 1 for emergency contact information
Section 8 for information on appropriate personal protective equipment.
Section 13 for Waste disposal.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Prevent formation of dust.

7.2 Conditions for safe storage including incompatibilities
Keep dry. Wet or damp material may be unsuitable for the purpose intended, creating unnecessary waste.

7.3 Specific end uses
Abrasive blasting may generate dusts.

SECTION 8: Exposure controls/personal protection

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

Product/component name	Exposure Limit Values
Copper slag	EH40/2005 WELs (United Kingdom (UK)). TWA: 4mg/m^3 8 hours. Form: Respirable dust TWA: 10mg/m^3 8 hours. Form: Total dust
Copper dusts and mists (as Cu)	EH40/2005 WELs (United Kingdom (UK)). TWA: 1mg/m^3 8 hours. Form: dusts and mists TWA: 0.2mg/m^3 8 hours. Form: fume STEL: 2mg/m^3 (15 minute reference period). Form: Total dust Refers only to metallic copper content.
Lead and inorganic compounds of lead (as Pb)	Control of Lead at Work Regulations 2002 (United Kingdom (UK)). TWA: 0.15mg/m^3 8 hours. Form: Total dust
Manganese and inorganic compounds of manganese (as Mn)	EH40/2005 WELs (United Kingdom (UK)). TWA: 0.5mg/m^3 8 hours. Form: Total dust
Chromium (III) compounds (as Cr)	EH40/2005 WELs (United Kingdom (UK)). TWA: 0.5mg/m^3 8 hours. Form: Total dust
Nickel and water insoluble nickel compounds (as Ni)	EH40/2005 WELs (United Kingdom (UK)). TWA: 0.5mg/m^3 8 hours. Form: Total dust
Arsenic and arsenic compounds (as As)	EH40/2005 WELs (United Kingdom (UK)). TWA: 0.1mg/m^3 8 hours. Form: Total dust
Cobalt and cobalt compounds (as Co)	EH40/2005 WELs (United Kingdom (UK)). TWA: 0.1mg/m^3 8 hours. Form: Total dust
Tin compounds (as Sn)	EH40/2005 WELs (United Kingdom (UK)). TWA: 2mg/m^3 8 hours. Form: Total dust
Cadmium compounds (as Cd)	EH40/2005 WELs (United Kingdom (UK)). TWA: 0.025mg/m^3 8 hours. Form: Total dust

8.2 Exposure controls

Risk management measures aimed at the protection of human health are to be considered in cases of inhalation of powder or dusts during use. Process enclosures, local exhaust ventilation or other engineering controls should be employed to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Personal protective equipment:	Wear suitable protective clothing.
Hand protection:	Wear suitable gloves. Where necessary, gauntlets should be worn to protect against abrasive ricochet.
Respiratory protection:	Use properly fitted respiratory protection, complying with an approved standard, appropriate for the known or anticipated exposure levels and the hazards of the product. Blasters should wear an air-fed blasting helmet complying with approved standards, to afford the correct level of respiratory and eye/face protection.
Eye/face protection:	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to dusts. If operating conditions cause high dust concentrations wear dust goggles.
Hygiene measures:	Handle in accordance with good industrial hygiene and safety practices. Wash hands, forearms and face thoroughly before eating or smoking and at the end of the working period. Routinely wash work clothing and protective equipment to remove contaminants.

Environmental exposure controls:	Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of the environmental protection legislation.

SECTION 9: Physical and chemical properties

9.1 Information on the basic physical and chemical properties

Appearance	Solid, angular particles. Colour: Black
Odour	Odourless
Odour threshold	Not applicable
pH	Not applicable
Melting point	1027-1341°C
Initial boiling point and range	Not applicable
Flash Point	Not applicable
Evaporation rate	Not applicable
Flammability (solid, gas)	Non-flammable
Upper/lower flammability or explosive limits	Not applicable
Vapour pressure	Not applicable
Vapour density	Not applicable
Relative Density (ref water at 20°C)	3.11 – 4.2
Solubility	Poorly soluble[1]
Partition coefficient: n-octanol/water	Not applicable
Auto-ignition temperature	Not applicable
Decomposition temperature	Decomposition and/or melting starts at 1059°C
Viscosity	Not applicable
Explosive properties	Non explosive
Oxidising properties	Non-oxidising

[1]Solubilisation and agitation for 14 days at pH6.3-7.6 resulted in dissolved Cu, Ni, Pb <0.2mg/l. Transformation/dissolution (OECD, 2001) is more suitable for metals and sparingly soluble metal compounds (see IUCLID Section 5.6). The outcomes of the transformation/dissolution tests were used for aquatic classification.

9.2 Other information

Not applicable

SECTION 10: Stability and reactivity

10.1 Reactivity:

Not applicable. See section 9.

10.2 Chemical stability:

Under normal conditions of use and storage, the product is stable.

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:

The substance does not decompose. 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 toxicological effects

Acute toxicity:

Oral: Not classified as hazardous for acute toxicity by oral route.

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: Not classified as hazardous for acute toxicity by inhalation route.

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: Not classified as hazardous for acute toxicity by dermal route.

Consideration of available acute dermal toxicity data (i.e. LD50>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/cm^2/week)

Irritation/Corrosion:

Skin/Eye: 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).

Sensitiser:

Skin/Respiratory: Not sensitizing.

Copper slag contains only minor constituents classified as skin or respiratory sensitisers but their actual levels are much lower than < 1% thus copper slag is not classified for skin or respiratory sensitization. Assessed by calculation: excel MECLAS tool (Verdonck; D'Havé (2010) in accordance to the EU CLP guidance (2009). Conclusion further confirmed by in-vitro bio-accessibility test in artificial sweat fluid in accordance with standardized test method (EN 1811).

Mutagenicity: Negative.

Two EU B13 studies: (Cantalejo and Catediano, 1997) with *Salmonella typhimurium* (strains TA 98, TA 100, TA 1537 and TA 1538) and (Caballero and Alava, 2000) with *Escherichia coli WP2 uvrApKM 101* indicate negative results with respect to genotoxic activity observed. Copper slag does not contain any constituents classified as a Category 1 mutagen. It does contain minor constituents (Cd compounds) classified as a Category 2 mutagen at actual levels much lower than < 0.1% thus much lower than the generic concentration limit of 1% for extrapolating the classification Cat 2 from one constituent to the UVCB substance. Therefore copper slag does not meet criteria for classification for germ cell mutagenicity. Assessed by calculation: excel MECLAS tool (Verdonck; D'Havé (2010)) in accordance to the EU CLP guidance (2009)

Carcinogenicity: Negative.

Copper slag does not contain any constituents classified as a Category 1 carcinogen. It does contain minor constituents classified as a Category 2 carcinogen but below 1.0 %. Therefore copper slag does not meet criteria for classification for carcinogenicity. Assessed by calculation: excel MECLAS tool (Verdonck; D'Havé (2010)) in accordance to the EU CLP guidance (2009)

Reproductive Toxicity: Negative.

Based on consideration of chemical composition and reduced bio-accessibility no reproductive toxicity classification is warranted. Assessed by calculation: excel MECLAS tool (Verdonck; D'Havé (2010)) in accordance to the EU CLP guidance (2009)

STOT (repeated exposure): Not classified by oral or inhalation route

Based on the information on bio-accessible constituents, the classification criteria for oral and inhalation route are not met.
Oral (rat), 90 days repeated dose, dose concentration >100 mg/kg body weight /day Inhalation rat, 90 days repeated dose, dust/mist/fume dose/concentration >2 mg/Litre/6h/day Assessed by calculation: excel MECLAS tool (Verdonck; D'Havé (2010)) in accordance to the EU CLP guidance (2009)

12: Ecological information

12.1 Ecotoxicity

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 (Rodriguez et al., 2010). Transformation/dissolution tests for 7 days at pH 6 (worst case) and loading of 100mg/L were performed on 12 samples. The results demonstrate low releases of copper to the OECD media: 2.6 µg Cu/L from granules. Other metals lead, nickel, zinc, arsenic and cadmium were below the detection limits.

Acute fresh water toxicity: Not classified

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, 2010)
- 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, 2010)
- 72 h EC50 (*N. Pelliculosa)* 1047 mg/L to >3125 mg/L (Wenzel, 2010)
- 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: Not classified

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 >674 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 fish:

- NOEC (fish, crustacean, algae) >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.

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

Not applicable

12.4 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 slags

Copper slags are not PBT or vPvB.

12.5 Other adverse effects

None

SECTION 13: Disposal considerations

The spent abrasive must be disposed of in accordance with national legislation, see Section 16.
The material is nonhazardous and, as supplied, may be disposed of under European Waste Catalogue (EWC 2002) entry 10 06 01 (slags from primary and secondary production of copper) a nonhazardous category. However, once used as a shot blast media, the material must be disposed of under 12 01 16 (waste blasting material containing dangerous substances) or 12 01 17 (waste blasting material other than those mentioned in 12 01 16). The waste producer must determine if hazardous substances in the coating being removed are likely to render the waste hazardous. Please note that a metal ion analysis, in isolation, may lead to an incorrect classification. Information on the composition in Section 3 and ecotoxicity in Section 12 will assist in making a correct classification.

SECTION 14: Transport information

14.1 UN number
Not applicable

14.2 UN proper shipping name
Not applicable

14.3 Transport hazard classes
Not applicable

14.4 Packaging group
Not applicable

14.5 Environmental hazards
Not applicable

14.6 Special precautions for user
Not applicable

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC code
Not applicable

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
The product is not subject to identification regulations under EC Directives

15.2 Chemical Safety Assessment
A Chemical Safety Assessment has been carried out for the substance.

SECTION 16: Other information

Abbreviations and acronyms:

CLP=	Classification, Labeling and Packaging Regulation [Regulation (EC) No. 1272/2008]
DNEL=	Derived No Effect Level
EWC=	European Waste Catalogue
NOEC=	No Observed Effect Concentration
PNEC=	Predicted No Effect Concentration

Key literature references and sources of data:

Workplace Exposure Limits -2005. HSE EH40/2005
Workplace Exposure Limits –Supplement 2007. HSE EH40/2005

EC Commission Directive 2001/58/EC
EC Commission Regulation 1907/2006
and amendment EC 987/2008

Legislation:

The Waste (England & Wales) Regulations 2011
The Waste (Miscellaneous Provisions) (Wales) Regulations 2011
The Waste (Scotland) Regulations 2011
The Waste (Northern Ireland) Regulations 2011
The List of Wastes Regulations 2005

Disclaimer:
To the best of our knowledge, the information contained herein is accurate. However, it shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship. 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 own judgement in determining its appropriateness for a particular purpose.