# Safety Data Sheet

**Version: 2.0 Date: 3rd June 2024, First Issue Date: 27th February 2023**

**ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878**

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

**1.1 Product identifier**

| | |
|---|---|
| Product name | 15-5PH (<15 µm) |
| Product code | GMP 15-5PH |
| Unique Formula Identifier (UFI) | not applicable |
| Nanoform | not applicable |

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

| | |
|---|---|
| Identified Use(s) | Additive manufacturing, hot isostatic pressing, thermal spray, metal injection moulding, binder jetting. |
| Uses advised against | Anything other than the above. |

**1.3 Details of the supplier of the safety data sheet**

| | |
|---|---|
| **Company Identification** | Globus Metal Powders Ltd. |
| Telephone | Materials Processing Institute, Eston Road, Middlesbrough, TS6 6US |
| Fax | +44(0)164 238 2000 |
| E-mail (competent person) | gmp@globusmetalpowders.com |

**1.4 Emergency telephone number**

| | |
|---|---|
| Emergency Phone No. | 999 / 111 (or local emergency number) |
| Language(s) spoken: | English (or local language) |

## 2. SECTION 2: Hazards identification

**2.1 Classification of the substance or mixture**

**Regulation (EC) No. 1272/2008 (CLP)**

Skin Sens. 1; H317
Carc. 2; H351
STOT RE 2; H373
Aquatic Chronic 3; H412

**2.2 Label elements**

According to Regulation (EC) No. 1272/2008 (CLP)

Product name: 15-5PH

Contains: Nickel

Hazard Pictogram(s)

Signal Word(s): DANGER

Hazard Statement(s):

H317: May cause an allergic skin reaction.
H351: Suspected of causing cancer.
H373: May cause damage to organs through prolonged or repeated exposure.
H412: Harmful to aquatic life with long lasting effects.

Precautionary Statement(s):

P201: Obtain special instructions before use.
P260: Do not breathe dust.
P280: Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
P302+P352: IF ON SKIN: Wash with plenty of water.
P308+P313: IF exposed or concerned: Get medical advice/attention.
P273: Avoid release to the environment.

| | | |
|---|---|---|
| | Supplemental information | Not applicable |
| **2.3** | **Other hazards** | Handling of this material may generate a dust which can cause mechanical irritation of the eyes, skin nose and throat. May form combustible dust concentrations in air. |

## 3. SECTION 3: Composition/information on ingredients

**3.1 Substances**

Not applicable

**3.2 Mixtures**

EC Classification Regulation (EC) No. 1272/2008 (CLP)

| Chemical identity of the substance | %W/W | CAS No. | EC No. | REACH Registration No. | Hazard Statement(s) |
|---|---|---|---|---|---|
| Nickel | 1 - <6 | 7440-02-0 | 231-111-4 | Not yet assigned in the supply chain | Skin Sens. 1; H317<br>Carc. 2; H351<br>STOT RE 1; H372<br>Aquatic Chronic 3; H412 |
| Copper | 2.5 - < 5 | 7440-50-8 | 231-159-6 | Not yet assigned in the supply chain | Aquatic Acute 1; H400<br>Aquatic Chronic 2; H411 |
| Manganese | 0.1 - < 1 | 7439-96-5 | 231-105-1 | Not yet assigned in the supply chain | Aquatic Chronic 2; H411 |

Note: For full text of H phrases see section 16.

## 4. SECTION 4: First aid measures

**4.1 Description of first aid measures**

| | |
|---|---|
| Self-protection of the first aider | Obtain special instructions before use. No action should be taken involving personal risk. Use personal protective equipment as required. Wear appropriate personal protective equipment, avoid direct contact. Ensure adequate ventilation. Do not breathe dust. Avoid contact with skin and eyes. |
| inhalation | IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention immediately. |
| Skin contact | IF ON SKIN: Gently wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Remove contaminated clothing and wash clothing before reuse. |
| Eye contact | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.If irritation develops and persists, get medical attention. |
| Ingestion | IF SWALLOWED: Rinse mouth. Give plenty of water to drink. Do NOT induce vomiting. Seek medical treatment. |

**4.2 Most important symptoms and effects, both acute and delayed**

May cause an allergic skin reaction. Suspected of causing cancer. May cause damage to organs through prolonged or repeated exposure.

**4.3 Indication of any immediate medical attention and special treatment needed**

Treat symptomatically.

## 5. SECTION 5: Firefighting measures

**5.1 Extinguishing media**

Suitable extinguishing media — As appropriate for surrounding fire. Use CO2, dry chemical, or foam.

| | | |
|---|---|---|
| | Unsuitable extinguishing media | Do not use water jet. Direct water jet may spread the fire. |
| **5.2** | **Special hazards arising from the substance or mixture** | Not flammable. May form combustible dust concentrations in air. Combustion products:, Carbon monoxide, Carbon dioxide and Nickel carbonyl gas. |
| **5.3** | **Advice for firefighters** | Fight fire with normal precautions from a reasonable distance. Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Keep containers cool by spraying with water if exposed to fire. Avoid run off to waterways and sewers. |

## 6. SECTION 6: Accidental release measures

| | | |
|---|---|---|
| **6.1** | **Personal precautions, protective equipment and emergency procedures** | Caution - spillages may be slippery. Ensure operatives are trained to minimise exposures. No action should be taken involving personal risk. Wear appropriate personal protective equipment, avoid direct contact. Do not breathe dust. Ensure adequate ventilation. Remove contaminated clothing and wash all affected areas with plenty of water. Avoid dust generation. |
| **6.2** | **Environmental precautions** | Avoid release to the environment. Do not allow to enter drains, sewers or water courses. |
| **6.3** | **Methods and material for containment and cleaning up** | Provided it is safe to do so, isolate the source of the leak. Sweep spilled substances into containers if appropriate moisten first to prevent dusting. Use non-sparking equipment when picking up flammable spill. Collect mechanically and dispose of according to Section 13. Use non-sparking tools. Ventilate the area and wash spill site after material pick-up is complete. |
| **6.4** | **Reference to other sections** | See Section: 8,13. |

## 7. SECTION 7: Handling and storage

| | | |
|---|---|---|
| **7.1** | **Precautions for safe handling** | When using do not eat or drink. Provide adequate ventilation when using the material and follow the principles of good occupational hygiene to control personal exposures. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Do not eat, drink or smoke when using this product. Remove contaminated clothing and wash clothing before reuse. |
| **7.2** | **Conditions for safe storage, including any incompatibilities** | Keep only in original packaging. Keep in a well ventilated place. Keep container closed. |
| | storage temperature | Store in a cool/low-temperature, well-ventilated (dry) place away from heat and ignition sources. |
| | Incompatible materials | Keep away from: acids and strong oxidising agents. |
| **7.3** | **Specific end use(s)** | See Section: 1.2. |

## 8. SECTION 8: Exposure controls/personal protection

**8.1 Control parameters**

**8.1.1 Occupational exposure limits**

The UK HSE (EH40) recommends the following limits for dusts: 10 mg/m³ (8hr TWA) total inhalable dust; 4 mg/m³ (8hr TWA) total respirable dust.

| SUBSTANCE | CAS No. | LTEL (8 hr TWA ppm) | LTEL (8 hr TWA mg/m³) | STEL (ppm) | STEL (mg/m³) | Note |
|---|---|---|---|---|---|---|
| Nickel | 7440-02-0 | - | 0.5 | - | - | UK WEL |
| Copper and compounds; dust and mists | - | 0.2 | - | - | - | UK WEL |
| Manganese | 7439-96-5 | -<br>- | 0.2<br>0.05 | -<br>- | -<br>- | UK WEL<br>Inhalable fraction<br>Respirable fraction |
| Silicon | 7440-21-3 | - | 10<br>4 | 10<br>4 | 10<br>4 | UK WEL<br>Inhalable fraction<br>Respirable fraction |

Source: WEL: Workplace Exposure Limit (UK HSE EH40).

| | | |
|---|---|---|
| **8.1.2** | **Biological Limit Value** | Not established. |
| **8.1.3** | **PNECs and DNELs** | Not established. |

**8.2 Exposure controls**

| | | |
|---|---|---|
| **8.2.1** | **Appropriate engineering controls** | Provide adequate ventilation, including appropriate local extraction if dusts, fumes or vapours are likely to be evolved. Do not breathe dust. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment). |
| **8.2.2** | **Individual protection measures, such as personal protective equipment** | Obtain special instructions before use. Keep good industrial hygiene. Wear appropriate personal protective equipment, avoid direct contact. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke at the work place.Do not breathe dust. |

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.

| | |
|---|---|
| Eye / face protection  | Wear eye protection with side protection (EN166). Eyewash bottles should be available. |
| Skin protection  | **Hand protection:** Wear impervious gloves (EN374). Gloves should be changed regularly to avoid permeation problems. Breakthrough time of the glove material: refer to the information provided by the gloves' producer. Protective index 6, corresponding > 480 minutes of permeation time according to EN 374.<br><br>**Body protection:** Wear dust-resistant protective clothing. |
| Respiratory protection  | Not normally required. Wear suitable respiratory protective equipment if processing involves working in areas where dusts or vapours are likely to be evolved. In case of inadequate ventilation wear respiratory protection. Recommended: EN143 Type A-P2. |
| Thermal hazards | Not applicable |

| | | |
|---|---|---|
| **8.2.3** | **Environmental exposure controls** | Avoid release to the environment. |

## 9. SECTION 9: Physical and chemical properties

**9.1 Information on basic physical and chemical properties**

| | |
|---|---|
| Physical state | Solid |
| Colour | Grey |
| Odour | Odourless |
| Melting point/freezing point | No information available. |
| Boiling point or initial boiling point and boiling range | No information available. |
| Flammability | Not flammable |
| Lower and upper explosion limit | Not applicable |
| Flash point | Not applicable |
| Auto-ignition temperature | Does not support combustion. (BS EN 14034)<br>Layer ignition temperature - >400°C (BS EN 50281-2-1) |
| Decomposition temperature | Not applicable |
| pH | No information available. |

| | |
|---|---|
| Kinematic viscosity | Not applicable |
| Solubility | No information available. |
| Partition coefficient: n-octanol/water (log value) | Not applicable |
| Vapour pressure | Not applicable |
| Density and/or relative density | 7.78 g/cm$^3$ |
| Relative vapour density | Not applicable |
| Particle characteristics | <15 µm |

**9.2 Other information**

| | |
|---|---|
| Moisture content | 0.19 % w/w |
| Explosive properties | May form combustible dust concentrations in air. |

## 10. SECTION 10: Stability and reactivity

| | | |
|---|---|---|
| **10.1** | **Reactivity** | Stable under normal conditions. |
| **10.2** | **Chemical stability** | Stable under normal conditions. |
| **10.3** | **Possibility of hazardous reactions** | Hazardous polymerisation will not occur. May form combustible dust concentrations in air. |
| **10.4** | **Conditions to avoid** | Hydrogen gas can be liberated when nickel or its alloys react with acids. In reduced atmospheres nickel can react with carbon monoxide to form Ni(CO)4, which is an extremely toxic gas. |
| **10.5** | **Incompatible materials** | Keep away from: acids and strong oxidising agents. |
| **10.6** | **Hazardous decomposition products** | Combustion products:, Carbon monoxide, Carbon dioxide and Nickel carbonyl gas. |

## 11. SECTION 11: Toxicological information

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

| | | |
|---|---|---|
| **Acute toxicity - Ingestion** | | Mixture: Based upon the available data, the classification criteria are not met. Calculated acute toxicity estimate (ATE) >2,000 mg/kg. |
| **Acute toxicity - inhalation** | | Mixture: Based upon the available data, the classification criteria are not met. Calculated acute toxicity estimate (ATE) > 5 mg/L (Dust) |
| **Acute toxicity - Skin contact** | | Mixture: Based upon the available data, the classification criteria are not met. Calculated acute toxicity estimate (ATE) >2,000 mg/kg. |
| **Skin corrosion/irritation** | | Mixture: Based upon the available data, the classification criteria are not met. |
| **Serious eye damage/irritation** | | Mixture: Based upon the available data, the classification criteria are not met. |
| **Respiratory or skin sensitisation** | | Mixture: Skin Sens. 1; H317: May cause an allergic skin reaction. |
| | Nickel | Skin Sens. 1; H317: May cause an allergic skin reaction.<br>EU Harmonised Classification<br>EU ECHA Registration Endpoint summary<br>Skin sensitisation - Adverse effects observed (NiPERA Report, 2010) |
| **Germ cell mutagenicity** | | Mixture: Based upon the available data, the classification criteria are not met. |
| **Carcinogenicity** | | Mixture: Carc. 2; H351: Suspected of causing cancer. |
| | Nickel | Carc. 2; H351: Suspected of causing cancer.<br>EU Harmonised Classification<br>EU ECHA Registration Endpoint summary |
| Reproductive toxicity | | Mixture: Based upon the available data, the classification criteria are not met. |
| **STOT - single exposure** | | Mixture: Based upon the available data, the classification criteria are not met. |
| **STOT - repeated exposure** | | Mixture: STOT RE 2; H373: May cause damage to organs through prolonged or repeated exposure. |
| | Nickel | STOT RE 1; H372: Causes damage to organs through prolonged or repeated exposure.<br>EU Harmonised Classification<br>oral: NOAEL – 2.2 mg/kg/bw day (rat) (Unnamed publication, 2007)<br>inhalation: LOAEC – 0.1mg/m$^3$ (rat) (OECD 451)<br>dermal: No data |
| **Aspiration hazard** | | Mixture: Based upon the available data, the classification criteria are not met. |

| | | |
|---|---|---|
| | Acute toxicity - Ingestion | Mixture: Based upon the available data, the classification criteria are not met. Calculated acute toxicity estimate (ATE) >2,000 mg/kg. |
| **11.2** | **Information on other hazards** | |
| **11.2.1** | Endocrine disrupting properties | This product does not contain a substance that has endocrine disrupting properties with respect to humans as no components meets the criteria. |
| **11.2.2** | Other information | None Known |

## 12. SECTION 12: Ecological information

| | | |
|---|---|---|
| **12.1** | **Toxicity** | Mixture: Aquatic Chronic 3; H412: Harmful to aquatic life with long lasting effects. estimated LC50 (Mixture): >10 - ≤ 100 mg/l |
| | Nickel | Aquatic Chronic 3; H412: Harmful to aquatic life with long lasting effects. EU Harmonised Classification NOEC: 0.057 ug/L (Birge et al. 1984) |
| | Copper | Aquatic Chronic 2; H411: Toxic to aquatic life with long lasting effects. EU Harmonised Classification |
| | Manganese | Aquatic Chronic 2; H411: Toxic to aquatic life with long lasting effects. LC50: 0.17-15.61 mg/l (28 days) (U. S. National Library of Medicine, 2018) |
| **12.2** | **Persistence and degradability** | No data for the mixture as a whole. |
| | Nickel | Not applicable for inorganic substances. |
| | Copper | Not applicable for inorganic substances. |
| | Manganese | Not applicable for inorganic substances. |
| **12.3** | **Bioaccumulative potential** | No data for the mixture as a whole. |
| | Nickel | Low bioaccumulation potential. BCF: 45 (Alikhan et al. 1989) |
| | Copper | Testing can be waived because the substance is an inorganic compound |
| | Manganese | Low bioaccumulation potential. BCF: 19 (SOREN NORDAHL HANSEN, et.al. 1995) |
| **12.4** | **Mobility in soil** | No data for the mixture as a whole. |
| | Nickel | The product is predicted to have high mobility in soil. Log Kp: 4.51 (Elbaz-Poulichet et al. 1996) |
| | Manganese | The product is predicted to have low mobility in soil. Kd: ~994 (OECD 106) |
| | **Toxicity** | Mixture: Aquatic Chronic 3; H412: Harmful to aquatic life with long lasting effects. estimated LC50 (Mixture): >10 - ≤ 100 mg/l |
| **12.5** | **Results of PBT and vPvB assessment** | Not classified as PBT or vPvB. |
| **12.6** | **Endocrine disrupting properties** | Does not cause endocrine disruption. |
| **12.7** | **Other adverse effects** | None known. |

## 13. SECTION 13: Disposal considerations

| | | |
|---|---|---|
| **13.1** | **Waste treatment methods** | Do not allow to enter drains, sewers or watercourses. Dispose of this material and its container as hazardous waste Disposal should be in accordance with local, state or national legislation. |
| **13.2** | **Additional information** | Avoid release to the environment. |

## 14. SECTION 14: Transport information

Not classified according to the United Nations 'Recommendations on the Transport of Dangerous Goods'.

| | | ADR/RID | IMDG | IATA/ICAO |
|---|---|---|---|---|
| **14.1** | **UN number or ID number** | None assigned | None assigned | **None assigned** |
| **14.2** | **UN proper shipping name** | None assigned | None assigned | None assigned |
| **14.3** | **Transport hazard class(es)** | None assigned | None assigned | None assigned |
| **14.4** | **Packing group** | None assigned | None assigned | None assigned |
| **14.5** | **Environmental hazards** | Not classified | Not classified as a Marine Pollutant. | Not classified |

| | | | | |
|---|---|---|---|---|
| **14.6** | **Special precautions for user** | See Section: 2 | | |
| **14.7** | **Maritime transport in bulk according to IMO instruments** | No information available. | No information available. | No information available. |
| **14.8** | **Additional information** | None | None | None |

## 15. SECTION 15: REGULATORY INFORMATION

| | | |
|---|---|---|
| **15.1** | **Safety, health and environmental regulations/legislation specific for the substance or mixture** | |
| **15.1.1** | **EU regulations** | |
| | Authorisations and/or restrictions on use | Not restricted |
| **15.1.2** | **National regulations** | |
| | Germany | Water hazard class: 2 |
| **15.2** | **Chemical Safety Assessment** | A REACH chemical safety assessment has not been carried out. Exposure scenarios for substances in this preparation are not available. |

## 16. SECTION 16: Other information

**The following sections contain revisions or new statements: Not applicable – V1.0**

**References:**
EU **Harmonised Classification** and EU ECHA registration dossier for Nickel (CAS No. 7440-02-0) and Copper (CAS No. 7440-50-8).
ECHA registration dossier for Manganese (CAS No. 7439-96-5).
Test Result, Report Number: R002912R2V1RS, Sigma-HSE (UK) Ltd (2022).

EU Classification: This Safety Data Sheet was prepared in accordance with EC Regulation (EC) 1907/2006 (REACH), 1272/2008 (CLP) & 2020/878

| **Classification of the substance or mixture According to Regulation (EC) No. 1272/2008 (CLP)** | **Classification procedure** |
|---|---|
| Skin Sens. 1; H317 | Threshold Calculation |
| Carc. 2; H351 | Threshold Calculation |
| STOT RE 2; H373 | Threshold Calculation |
| Aquatic Chronic 3; H412 | Summation Calculation |

**Legend**

| | |
|---|---|
| ADR | ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road |
| BCF | Bioconcentration Factor |
| CAS | CAS: Chemical Abstracts Service |
| DNEL | Derived no effect level |
| EC | EC: European Community |
| EN | European Standard |
| EU | European Union |
| IATA | IATA: International Air Transport Association |
| ICAO/IATA | ICAO: International Civil Aviation Organization / IATA: International Air Transport Association |
| IMDG | IMDG: International Maritime Dangerous Goods |
| LC50 | Lethal concentration 50 |
| LD50 | Lethal dose 50 |
| LIT | Layer Ignition Temperature |
| LOAEC | Lowest Observed Adverse Effect Concentration |
| LTEL | Long term exposure limit |
| MIE | Minimum Ignition Energy |
| MIT | Minimum Ignition Temperature |
| NOEC | No Observed Effect Concentration |
| NOAEL | No Observed Adverse Effect Level |
| OECD | Organisation for Economic Cooperation and Development |
| PBT | PBT: Persistent, Bioaccumulative and Toxic |
| PNEC | Predicted No Effect Concentration |

| | |
|---|---|
| REACH | Registration, Evaluation, Authorisation and Restriction of Chemicals |
| STEL | Short term exposure limit |
| TWA | Time Weighted Average |
| UN | United Nations |
| vPvB | very Persistent and very Bioaccumulative |
| WGK | Wassergefährdungsklasse (Germany) / water hazard class |

| **Hazard classification / Classification code:** | **Hazard Statement(s)** |
|---|---|
| Skin Sens. 1; Skin Sensitisation, Category 1 | H317: May cause an allergic skin reaction. |
| Carc. 2; Carcinogenicity, Category 2 | H351: Suspected of causing cancer. |
| STOT RE 1; Specific target organ toxicity — repeated exposure, Category 1 | H372: Causes damage to organs through prolonged or repeated exposure. |
| STOT RE 2; Specific target organ toxicity — repeated exposure, Category 2 | H373: May cause damage to organs through prolonged or repeated exposure. |
| Aquatic Acute 1; Hazardous to the aquatic environment, acuteacute, Category 1 | H400: Very toxic to aquatic life. |
| Aquatic Chronic 2; Hazardous to the aquatic environment, Chronic , Category 2 | H411: Toxic to aquatic life with long lasting effects. |
| Aquatic Chronic 3; Hazardous to the aquatic environment, Chronic , Category 3 | H412: Harmful to aquatic life with long lasting effects. |

Training advice: Consideration should be given to the work procedures involved and the potential extent of exposure as they may determine whether a higher level of protection is required.

**Disclaimers**

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**Annex to the extended Safety Data Sheet (eSDS)**

Exposure scenarios for substances in this preparation are not available.