SAFETY DATA SHEET

Version: 3.0 Revision date: 3rd June 2024, Date of First Issue: 20th April 2022

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

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product name	IN718 Metal Powder <15 µm GMP 718
Unique Formula Identifier (UFI)	Not assigned
Nanoform	Not assigned

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	Any other use.

1.3 Details of the supplier of the safety data sheet

Company Identification	Globus Metal Powders Ltd. Materials Processing Institute, Eston Road, Middlesbrough, TS6 6US
Telephone	+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)
Languages spoken	English (or local language)

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

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

Skin Sens. 1; H317
Resp Sens. 1; H334
Carc. 1B; H350
Repr. 1B; H360F
STOT RE 1; H372
Aquatic Chronic 3; H412

2.2 Label elements

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

Product name: IN718 <15 µm Metal Powder

Contains: Nickel and Cobalt

Hazard Pictogram(s)

Signal Word(s): DANGER

Hazard Statement(s)

H317: May cause an allergic skin reaction.
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H350: May cause cancer.
H360F: May damage fertility.
H372: Causes 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. P280: Wear protective gloves/protective clothing/eye protection/face protection/hearing protection. P302+P352: IF ON SKIN: Wash with plenty of water. P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P308+P313: IF exposed or concerned: Get medical advice/attention. P342+P311: If experiencing respiratory symptoms: Call a doctor.
Supplemental information	Not applicable

2.3 Other hazards

May form combustible dust concentrations in air. Handling of this material may generate a dust which can cause mechanical irritation of the eyes, skin nose and throat.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

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 classification
Nickel	25 - < 60	7440-02-0	231-111-4	01-2119438727-29-0036	Skin Sens. 1; H317 Carc. 2; H351 STOT RE 1; H372 Aquatic Chronic 3; H412
Cobalt	0.1 - ≤ 1	7440-48-4	231-158-0	01-2119517392-44-0002	Acute Tox. 4; H302 Eye Irrit. 2; H319 Skin Sens. 1; H317 Resp Sens. 1; H334 Muta. 2; H341 Carc. 1B; H350 Repr. 1B; H360F Aquatic Chronic 4; H413
Manganese	0.1 - < 2	7439-96-5	231-105-1	01-2119449803-34-0039	Aquatic Chronic 2; H411

For full text of H phrases see section 16.

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. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause cancer. May damage fertility. Causes damage to organs through prolonged or repeated exposure.
4.3	**Indication of any immediate medical attention and special treatment needed**	Treat symptomatically.

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**	Explosion: May form combustible dust concentrations in air. Avoid dust generation. Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. 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.

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. Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration.
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.

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.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational exposure limits

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	-	-	WEL
Cobalt	7440-48-4	-	0.1	-	-	WEL, Carc
Aluminium	7429-90-5	- -	10 4	- -	- -	WEL Inhalable fraction Respirable fraction
Manganese	7439-96-5	- -	0.2 0.05	- -	- -	WEL Inhalable fraction Respirable fraction
Silicon	7440-21-3	- -	10 4	- -	- -	WEL Inhalable fraction Respirable fraction
Copper	7440-50-8	-	0.2	-	-	WEL

Source: WEL: Workplace Exposure Limit (UK HSE EH40)
Note: Chemicals lsted in Section 8 but not in Section 3 are not hazardous and do not impact the final mixture classification.
Carc. - Capable of causing cancer and/or heritable genetic damage.

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.

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.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	Solid
Colour	No information available.
Odour	Odourless
Melting point/freezing point	1210 - 1344°C
Initial boiling point and boiling range	No information available.
Flammability (solid, gas)	Explosion: May form combustible dust concentrations in air. Maximum explosion pressure rise (Pmax) = 2.9 bar (BS EN 14034) Coefficient of pressure rise (Kst) = 28 bar.m.s^{-1} (BS EN 14034) Maximum Rate of Pressure Rise (dP/dt)max = 103 bar.s-1 (BS EN 14034) St Class =1 (BS EN 14034)
Upper/lower flammability or explosive limits	Layer ignition temperature = >400°C (BS EN 50281-2-1) LIT Value (> 400°C), minus 75°C Safety Factor = 325 °C MIT Value (920°C), minus 1/3 Safety Factor = 613 °C Capacitive & Inductive MIE = > 1000 mJ
Flash point	No information available.
Auto-ignition temperature	No information available.
Decomposition temperature	No information available.
pH	No information available.
Viscosity	No information available
Solubility(ies)	No information available..
Partition coefficient: n-octanol/water	No information available..
Vapour pressure	No information available..
Vapour density	No information available..
Relative density	8.22 g/cm^3.

9.2 Other information

Particle size	<15 µm
Explosive properties	No information available.
Oxidising properties	Not oxidising.
Loss on Drying	No information available.
Moisture Content	0.0 % w/w

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.

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. Resp Sens. 1; H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
	Nickel	Skin Sens. 1; H317: May cause an allergic skin reaction. EU Harmonised Classification
	Cobalt	Skin Sens. 1; H317: May cause an allergic skin reaction. EU Harmonised Classification Sensitisation (Guinea pig) - Positive (Liden, 1994) Resp Sens. 1; H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled. EU Harmonised Classification
Germ cell mutagenicity		Mixture: Muta 2; H341: Suspected of causing genetic defects.
	Cobalt	Muta 2; H341: Suspected of causing genetic defects. EU Harmonised Classification
Carcinogenicity		Mixture: Carc. 1B; H350: May cause cancer.
	Cobalt	Carc. 1B; H350: May cause cancer. EU Harmonised Classification BMCL10: 0.414 mg/m³ (mouse) (Behl, M. et al. 2015)
Reproductive toxicity		Mixture: Repr. 1; H360F: May damage fertility.
	Cobalt	Repr. 1; H360F: May damage fertility. Reproductive - NOEL:30 mg/kg bw/day (rat) (OECD 422) Developmental toxicity - NOEL: 100 mg/kg bw/day (rat) (OECD 414)
STOT - single exposure		Mixture: Based upon the available data, the classification criteria are not met.
STOT - repeated exposure		Mixture: STOT RE 1; H372: Causes damage to organs through prolonged or repeated exposure.
	Nickel	STOT RE 1; H372: Causes damage to organs through prolonged or repeated exposure. EU Harmonised Classification Oral: NOAEL – 2.2 mg/kg/bw day (rat) (Unnamed publication, 2007) Inhalation: LOAEC – 0.1mg/m³ (rat) (OECD 451) Dermal: No data
Aspiration hazard		Mixture: Based upon the available data, the classification criteria are not met.

11.2 Information on other hazards

11.2.1	Endocrine disrupting properties	None known.
11.2.2	Other information	None known.

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)
	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.
	Cobalt	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)
		Cobalt	Low bioaccumulation potential. BCF: 23 (Warnau et al. 1999)
		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)
		Cobalt	The product is predicted to have high mobility in soil. BMCL10: 0.414 mg/m³ (Behl, M. et al. 2015)
		Manganese	The product is predicted to have low mobility in soil. Kd: ~994 (OECD 106)
12.5	**Results of PBT and vPvB assessment**		Not classified as PBT or vPvB.
12.6	**Endocrine disrupting properties**		None known.
12.7	**Other adverse effects**		None known.

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.

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.

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.

SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: New SDS Regulation 2020/878 format, all sections have been updated to include new information. Please review SDS with care.

References:

EU Harmonised Classification and ECHA registration dossier for Nickel (CAS No. 7440-02-0) and Cobalt (CAS No. 7440-48-4).
ECHA registration dossier for Manganese (CAS No. 7439-96-5).

Literature references

1. Liden, C.; Wahlberg, J.E. 1994. Cross-reactivity to metal compounds studied in guinea pigs induced with chromate or cobalt. Acta Derm. Venereol. 74, 341-343.
2. Behl, M. et al. 2015. Comparative toxicity and carcinogenicity of soluble and insoluble cobalt compounds. Toxicology 333, 195-205.
3. Birge, W.J., J.A. Black, J.F. Hobson, A.G. Westerman, and T.M. Short. 1984. Water Resources Research Institute. Kentucky University, Lexington, KY. Research Report No. 151.
4. U. S. National Library of Medicine. 2018. To determine long- term toxicity of test chemical on Oncorhynchus mykiss. HSDB (Hazardous Substances Data Bank); US national Library of Medicine reviewed by SRC.
5. Alikhan, M.A., Zia, S. 1989. Nickel uptake and regulation in a copper-tolerant Decapod, Cambarus (Fabricius) (Decapoda, Crustacea). Bull. Environ. Contam. Toxicol: 42, 94-102.
6. Warnau, M., S.W. Fowler, and J.L. Teyssie. 1999. Biokinetics of radiocobalt in the asteroid Asterias rubens (Echinodermata): sea water and food exposures. Marine Pollution Bulletin. 39(1-12):159-164.
7. SOREN NORDAHL HANSEN, et.al. 1995. Marine Pollution Bulletin, 1995.
8. Elbaz-Poulichet, F., Garnier, J.M., Guan, D.M., Martin, J.M., Thomas, A.J. 1996. The conservative behaviour of Trace metals (Cd, Cu, Ni, Pb) and As in the surface plume of stratified estuaries: example of the Rhome River (France). Estuarine, Coastal and Shelf Science: 42, 289-310.

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
Resp Sens. 1; H334	Threshold Calculation
Carc. 1B; H350	Threshold Calculation
Repr. 1B; H360F	Threshold Calculation
STOT RE 1; H372	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
BMCL10	Benchmark concentration
CAS	Chemical Abstracts Service
DNEL	Derived No Effect Level
EC	European Community
EN	European Standard
EU	European Union
IATA	International Air Transport Association
ICAO/IATA	ICAO: International Civil Aviation Organization / IATA: International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Lethal concentration 50
LD50	Lethal dose 50
LOAEC	Lowest observed adverse effect concentration
LTEL	Long Term Exposure Limit
NOEC	No Observed Effect Concentration
NOAEL	No Observed Adverse Effect Level
OECD	Organisation for Economic Cooperation and Development
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.
Resp. Sens. 1; Respiratory sensitization, Category 1	H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Muta. 2; Germ cell mutagenicity, Category 2	H341: Suspected of causing genetic defects.
Carc. 1B; Carcinogenicity, Category 1B	H350: May cause cancer.
Carc. 2; Carcinogenicity, Category 2	H351: Suspected of causing cancer.
Repr. 1B; Reproductive toxicity, Category 1B	H360F: May damage fertility.
STOT RE 1; Specific target organ toxicity — repeated exposure, Category 1	H372: Causes damage to organs through prolonged or repeated exposure.
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 are not applicable