

SAFETY DATA SHEET

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1. Product and Company Information

PRODUCT NAME 17-4PH Stainless Steel Powder
PRODUCT CODE 17-4PH-PO-PBF, 17-4PH-PO-DED, 17-4PH-PO-BJ
COMPANY Solitecs Pte Ltd
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RECOMMENDED USE Industrial additive manufacturing, research and development.

TYPICAL APPLICATIONS Aerospace structural components
Medical Instruments
Oil & Gas
Tooling Wear Resistant Components
Additive Manufacturing
Materials Development
Research & Development

2. Hazard Identification

2.1 GHS CLASSIFICATION (29 CFR 1910.1200):

Skin Irritation Category 2
Eye Irritation Category 2
Skin Sensitization Category 1
Specific Target Organ Toxicity (Respiratory Irritation) Category 3
Environmental Hazard: Not Classified GHS.
Classification based on available constituent information and intended industrial use.

2.2 GHS LABEL ELEMENTS:



SIGNAL WORD: Warning

HAZARD STATEMENTS:

H315 Causes skin irritation
H317 May cause allergic skin reaction
H319 Causes serious eye irritation
H335 May cause respiratory irritation
P261 Avoid breathing dust.
P272 Contaminated work clothing should not be allowed out of workplace.
P280 Wear protective gloves.

RESPONSE PRECAUTIONARY STATEMENTS:

P363: Wash contaminated clothing before reuse.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P333 + P313: If skin irritation or a rash occurs: Get medical advice/attention

ADDITIONAL HAZARD

Fine metallic powders may form explosive dust clouds when dispersed in air in the presence of an ignition source.

ADDITIONAL PHYSICAL HAZARDS

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Dust may cause mechanical eye irritation.
Dust may cause respiratory tract irritation.
Fine metallic powder may present a combustible dust explosion hazard.

3. Composition/Information on Ingredients

<u>Chemical name</u>	<u>CAS #</u>	<u>Content (Wt%)</u>
Iron (Fe)	7439-89-6	Balance
Chromium (Cr)	7440-47-3	15-20
Nickel (Ni)	7440-02-0	3-5
Copper (Cu)	7440-50-8	3-5
Niobium (Nb)	7440-03-1	0-0.45
Tantalum (Ta)	7440-25-7	0-0.45

The combined composition of Niobium (Nb) and Tantalum (Ta) is 0.15-0.45 %

4. First Aid Measures

4.1 Description of first aid measures:

GENERAL MEASURES:	No special requirements
AFTER INHALATION:	If inhaled, remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
AFTER SKIN CONTACT:	Remove contaminated clothing, brush material off skin, wash affected area with soap and water. Seek medical attention if symptoms persist.
AFTER EYE CONTACT:	Flush eyes with lukewarm water, including under upper and lower eyelids, for at least 15 minutes. Seek medical attention if symptoms persist.
AFTER INGESTION:	If swallowed, wash out mouth with water provided person is conscious. Do not induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention immediately.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

4.3 Indication of any immediate medical attention and special treatment needed

Treat symptomatically and supportively.

5. Fire Fighting Measures

FLAMMABILITY:	Bulk material is not considered flammable. Fine powder may present combustible dust hazards.
EXTINGUISHING MEDIA:	Dry sand, Class D metal fire extinguishing agents (e.g., Met-L-X®, Lith-X®)
UNSUITABLE EXTINGUISHING MEDIA:	Do not use water, foam, CO ₂ , or wet extinguishing agents.
SPECIAL FIRE FIGHTING PROCEDURE:	Use full-face, self-contained breathing apparatus with full protective clothing to prevent contact with skin and eyes. See section 10 for decomposition products.
SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS:	Full face, self-contained breathing apparatus and full protective clothing when necessary.
ADVICE FOR FIREFIGHTERS:	Evacuate personnel to safe areas. As in any fire, wear self-contained, breathing apparatus and full protective gear for firefighting.
FURTHER INFORMATION:	

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According to the standard chemical firefighting measures, choose extinguishing method appropriate for surrounding fire. Keep fire-fighting run-off water out of sewers and water sources. Avoid disturbing deposited dust during firefighting operations.

6. Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S):

Evacuate area. Ventilate area. Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Avoid contact with skin and eyes. Wear self-contained breathing apparatus, safety glasses, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP:

Do not create dust. Sweep up/shovel or use explosion-proof vacuum cleaner. Keep in suitable, closed containers for disposal or recycle.

ENVIRONMENTAL PRECAUTIONS:

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided. Avoid release into the environment due to nickel content.

7. Handling and Storage

HANDLING

Avoid creating dust. Avoid breathing dust or fumes. Provide adequate ventilation if dusts are created. Avoid contact with skin and eyes. Wash thoroughly before eating or smoking. Avoid sweeping dry powder. Ground and bond powder handling equipment to minimize static discharge. Prevent accumulation of airborne powder. See section 8 for information on personal protection equipment. Avoid prolonged skin contact due to potential nickel sensitization. Avoid generation of airborne respirable powder. Avoid use of compressed air for cleaning.

STORAGE

Keep container tightly closed. Keep away from heat, sparks and open flame. Store in a cool, dry ventilated place. See section 10 for more information on incompatible materials.

8. Exposure Controls/Personal Protection

Exposure Limits:

Component	OSHA PEL
Nickel metal	1.0 mg/m ³
Iron oxide fume	10.0 mg/m ³
Total dust	15.0 mg/m ³
Respirable dust	5.0 mg/m ³

Occupational exposure limits vary by jurisdiction. Refer to applicable local regulations.

ENGINEERING CONTROLS:

Ensure adequate ventilation to maintain exposures below occupational limits. Whenever possible the use of local exhaust ventilation or other engineering controls is the preferred method of controlling exposure to airborne dust and fume to meet established occupational exposure limits. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air.

RESPIRATORY PROTECTION:

If permissible levels are exceeded, use P100 / NIOSH approved dust respirator.

EYE PROTECTION:

Not required under normal conditions. Use face shield and safety glasses if in-eye risk exists. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

BODY PROTECTION:

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Wear antistatic protective clothing against chemicals and conductive safety shoes. The type of protective equipment must be selected according to the concentration and amount of the dangerous substances at the specific workplace.

HANDS PROTECTION:

Handle with chemical-resistant gloves. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product.

OTHER PROTECTION:

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. Physical and Chemical Properties

COLOR:	Grey metallic powder
FORM:	Solid in powder form
BOILING POINT:	N/A
ODOR:	Odorless
ODOR THRESHOLD:	Not determined
pH:	N/A
MELTING POINT:	1400-1500 °C
FLASH POINT:	N/A
FLAMMABILITY:	N/A
UPPER EXPLOSIVE LIMIT % (V/V):	N/A
LOWER EXPLOSIVE LIMIT % (V/V):	N/A
VAPOR PRESSURE:	N/A
VAPOR DENSITY:	N/A
DENSITY:	7.5 – 7.9 g/cm ³
SOLUBILITY IN WATER:	Insoluble
PARTITION COEFFICIENT: N-OCTANOL/WATER:	N/A
DECOMPOSITION TEMPERATURE:	N/A
VISCOSITY:	N/A

10. Stability and Reactivity

REACTIVITY: May react with strong oxidizing agents and / or strong acids

CHEMICAL STABILITY: Stable under normal conditions

POSSIBILITY OF HAZARDOUS REACTIONS:

None expected under normal conditions

CONDITIONS TO AVOID (STABILITY)

Avoid moisture, keep container tightly closed. Avoid dust generation.

INCOMPATIBILITY WITH OTHER MATERIALS:

Incompatible with strong oxidizing agents and strong acids. Other decomposition products- no data available. In the event of fire- see section 5.

11. Toxicological Information

LIKELY ROUTES OF EXPOSURE:

Inhalation, skin, eyes, mouth.

SYMPTOMS OF EXPOSURE:

May cause irritation.

ACUTE AND CHRONIC EFFECTS:

Acute effects – irritation.

ACUTE TOXICITY:

No data

SKIN CORROSION/IRRITATION:

May cause irritation.

SERIOUS EYE DAMAGE/EYE IRRITATION:

May cause eye irritation.

RESPIRATORY OR SKIN SENSITIZATION:

Nickel may cause skin sensitization.

GERM CELL MUTAGENICITY:

Based on available data, the classification criteria are not met.

CARCINOGENICITY:

Contains nickel. Exposure to nickel-containing dusts should be minimized

through appropriate industrial hygiene controls.

REPRODUCTIVE TOXICITY:

Based on available data, the classification criteria are not met. SPECIFIC

TARGET ORGAN TOXICITY- SINGLE EXPOSURE (GLOBALLY HARMONIZED SYSTEM):

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Dust exposure may cause transient respiratory irritation.

SPECIFIC TARGET ORGAN TOXICITY- REPEATED EXPOSURE (GLOBALLY HARMONIZED SYSTEM):
No data

ASPIRATION HAZARD: Based on available data, the classification criteria are not met.

POTENTIAL HEALTH EFFECTS:
Inhalation: May cause respiratory irritation. Repeated occupational exposure to nickel-containing dusts may increase the risk of allergic dermatitis. Appropriate engineering controls and PPE should be used.

SKIN CONTACT: May cause irritation. Nickel-containing dust may cause allergic skin reactions.

EYE CONTACT: May cause serious irritation.

INGESTION: Not an expected route of exposure. May be harmful if swallowed.

To the best of our knowledge the chemical, physical and toxicological characteristics of the substance are not fully known.

12. Ecological Information

Insoluble metallic powder.
Avoid uncontrolled release to the environment.
Nickel containing materials may be harmful to aquatic organisms under certain conditions.

13. Disposal Considerations

Dispose according to local regulations.
Do not dispose into drains or waterways.

14. Transport Information

SHIPPING REGULATIONS: Not regulated
UN NUMBER: Not regulated
UN PROPER SHIPPING NAME: Not regulated
TRANSPORT HAZARD CLASS: Not regulated
PACKING GROUP: Not regulated
MARINE POLLUTANT: No

Not regulated as dangerous goods based on available information. Classification should be confirmed according to particle size, packaging, quantity, and applicable transport regulations.

15. Regulatory Information (Not meant to be all-inclusive, selected regulations represented)

Sec 302 Extremely Hazardous: No
Sec 304 Reportable Quantities: N/A
Sec 313 Refer to applicable national and local regulations.

US Regulations:

Fire Hazard: Not classified under applicable regulations. Fine powder may present combustible dust hazards.
Pressure Hazard- No
Reactivity Hazard – No

16. Additional Information

Abbreviations:

pH- Relates to hydrogen ion concentration - this value will relate to a scale of 0 - 14, where 0 is highly acidic and 14 is highly alkaline

OSHA- Occupational Safety and Health Administration
NTP- National Toxicology Program
IARC- International Agency for Research on Cancer
CAS#- Chemical Abstract Service number - used to uniquely identify chemical compounds
ACGIH- The American Conference of Governmental Industrial Hygienists

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ADR- Agreement on Dangerous Goods by Road
IATA - International Air Transport Association
IMDG- International Maritime Dangerous Goods

DISCLAIMER

The information herein is believed to be accurate and is provided in good faith. However, no warranty, expressed or implied, is made regarding its accuracy or completeness. The given information is based on the available information and chemical properties of the materials and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Information provided in this SDS is meant to be used as a guide for use and handling of this product. Solitecs Pte Ltd shall not be held liable for any damage resulting from handling, contact and use of this material. Normal terms and Sales conditions apply for the use of these materials. Consult Solitecs Pte Ltd for further information.

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