**Product** Inconel 625 Powder

**Revision Date** 05/08/2016

Revision 1



# **Safety Data Sheet (SDS)**

# SECTION 1: IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

#### 1.1 Product Identifier

Product Name Inconel 625 Powder
Synonyms, Trade Names Metal Alloy Powder.
Nickel Base Powder.

# 1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

**Identified Uses** Metal powder for additive layer manufacture.

Uses Advised Against Any other purpose.

# 1.3 Details of the Supplier of the Safety Data Sheet

Supplier Renishaw plc

Brooms Road Stone Business Park Stone, Staffordshire ST15 0SH

United Kingdom

Tel: +44 (0) 1785 285000 (during UK office hours 09:00 to 17:00 UTC).

Contact Person msds@renishaw.com

1.4 Emergency Telephone Number

**Emergency Telephone** 999 / 911 or local emergency number.

# **SECTION 2: HAZARDS IDENTIFICATION**

# 2.1 Classifcation of the Substance or Mixture

Classification (EC 1272/2008)

Physical and Chemical Hazards Not classified

Human Health Resp. Sens 1 - H334, Skin. Sens 1 - H317, Carc. 2 - H351, STOT RE 1 - H372

Environment Not classified

## 2.2 Label Elements

Contains nickel cobalt

Label in Accordance With (EC) No. 1272/2008



Signal Word Danger

**Hazard Statements** H317 May cause an allergic skin reaction

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H351 Suspected of causing cancer of the lungs and respiratory tract.

H372 Causes damage to organs (respiratory tract and lungs) through prolonged or repeated

exposure by inhalation

**Precautionary Statements** Prevention

P201 Obtain special instructions before use.

P260 Do not breathe dust/fume/ gas/mist/vapours/spray.

P280 Wear protective gloves/ protective clothing/eye protection/face protection.

P285 In case of inadequate ventilation wear respiratory protection.

#### Response

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P304 + P341 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTRE or

doctor/physician

Storage

P405 Store locked up.

**EUH Statements** EUH208 Contains nickle and cobalt. May produce an allergic reaction

## 2.3 Other Hazards

Dust clouds may be explosive.

Dust can irritate the eyes. High dust levels may irritate the respiratory system.

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

## 3.1 Substance

Not applicable.

## 3.2 Mixtures

Name	Product Identifier	GHS Classification	%
nickel	CAS-No.: 7440-02-0 EC No.: 231-111-4	Skin. Sens 1 - H317, Carc. 2 - H351, STOT RE 1 - H372	60-100%
cobalt		Skin. Sens 1 - H317, Resp. Sens 1 - H334, Aquatic Chronic 4 - H413	1-10%
chromium	CAS-No.: 7440-47-3 EC No.: 231-157-5		1-10%
iron	CAS-No.: 7439-89-6 EC No.: 231-096-4		1-10%

The Full Text for all Hazard Statements Are Displayed in Section 16.

**Composition Comments** The data shown are in accordance with the latest EC Directives.

## **SECTION 4: FIRST AID MEASURES**

## **4.1 Description of First Aid Measures**

Eye Contact

General Information Provide general first aid, rest, warmth and fresh air. As a general rule, in case of doubt or if

symptoms persist, always call a doctor. Seek medical attention for all burns and eye injuries, regardless how minor they may seem. First aid personnel must be aware of own risk during

rescue.

**Inhalation** If inhaled, remove to fresh air. Check for clear airway, breathing, and presence of pulse. If

breathing is difficult, provide oxygen. Loosen any tight clothing on neck or chest. Provide cardiopulmonary resuscitation where pulse or respiration are absent. Get prompt medical

attention.

**Ingestion** DO NOT induce vomiting! Rinse mouth thoroughly. Get medical attention if discomfort

occurs. Never give anything by mouth to a person who is unconscious or is having

convulsions.

Skin Contact Remove contaminated clothing, shoes and jewelry and wash before reuse. Wash skin with

soap and water for several minutes. Get medical attention if irritation develops or persists. Do not rub eye. Avoid contaminating unaffected eye. Remove contact lenses if present and easy to do so. Rinse with a gentle stream of water or saline for at least 15 minutes. Hold eye

lids open. Get prompt medical attention.

## 4.2 Most Important Symptoms and Effects, Both Acute and Delayed

General Information The severity of the symptoms described will vary dependent on the concentration and the

length of exposure. Causes damage to organs through prolonged or repeated exposure.

Suspected of causing cancer.

**Inhalation** Inhalation can cause asthma like symptoms.

**Ingestion** Ingestion may cause gastrointestinal irritation with nausea, vomiting and diarrhea.

**Skin Contact** Can cause mechanical irritation or allergic skin reaction.

**Eye Contact** Dust can cause mechanical irritation.

## 4.3 Indication of any Immediate Medical Attention and Special Treatment Needed

Notes to the Physician Treat symptomatically.

#### **SECTION 5: FIRE-FIGHTING MEASURES**

#### 5.1 Extinguishing Media

**Extinguishing Media**Use gentle surface application of Class D extinguishing agent or dry inert granular material

(e.g., sand) to cover and ring the burning material. Use fire-extinguishing media appropriate

for surrounding materials.

**Unsuitable Extinguishing Media** Do NOT use water.

## 5.2 Special Hazards Arising From the Substance or Mixture

Hazardous Combustion Products Unusual Fire & Explosion Hazards

Specific Hazards

Decomposition of this product may yield metallic oxides. High concentrations of dust may form explosive mixture with air.

Fine dust if dispersed in air in sufficient concentrations and if in presence of a ignition source is a potential dust explosion hazard. If heated, harmful vapours may be formed.

#### **5.3 Advice for Firefighters**

**Special Fire Fighting Procedures** Gently smother burning material with dry sand or other inert substance, or special powder

(Class D - Dry Powder) extinguishers with spin applicator. Gently cover and ring the burning material. Apply extinguishing media carefully to avoid creating airborne dust. Do not disturb

the material until completely cool.

If possible, fight fire from protected position. Keep up-wind to avoid fumes. Avoid breathing

fire vapours. Ventilate closed spaces before entering them.

**Protective Equipment for** 

Firefighters

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard

EN 469 will provide a basic level of protection for chemical incidents.

# **SECTION 6: ACCIDENTAL RELEASE MEASURES**

## 6.1 Personal Precautions, Protective Equipment and Emergency Procedures

**Personal Precautions** Wear protective clothing as described in Section 8 of this safety data sheet. Avoid inhalation

of vapours and contact with skin and eyes. Provide adequate ventilation. In case of inadequate ventilation, use respiratory protection. Do not smoke, eat or drink while using

this product. Eliminate all sources of ignition. Wash hands after use.

Read and follow manufacturer's recommendations. Do not touch or walk through spilled material. If necessary evacuate surrounding areas. Keep unnecessary and unprotected

personnel from entering.

For Emergency Responders Follow safe handling advice and personal protective equipment recommendations for normal

use of product.

# **6.2 Environmental Precautions**

**Environmental Precautions** Prevent any material from entering drains or waterways.

# **6.3 Methods and Material for Containment and Cleaning Up**

Spill Clean Up Methods Prevent further leakage or spillage if safe to do so. Eliminate all sources of ignition. Restrict

non-essential personnel from the area. Collect any spilled material immediately by vacuuming or shoveling - use non sparking tools or equipment/natural bristle brushes. Use dry cleanup procedures. Take care not to raise dust. Place in labelled, dry, water-tight

containers. In case of spills, beware of slippery floors and surfaces.

#### **6.4 Reference to Other Sections**

**Reference to Other Sections** See section 1 for emergency contact. For personal protection, see section 8. For waste

disposal, see section 13.

## **SECTION 7: HANDLING AND STORAGE**

## 7.1 Precautions for Safe Handling

**Handling** Avoid generation of dust clouds. Use proper personal protection when handling (refer to

Section 8). Ensure good dust ventilation during handling. Formation of sparks and static electricity must be prevented. Earth all equipment. Avoid prolonged or repeated contact.

## 7.2 Conditions for Safe Storage, Including Any Incompatibilities

Storage Precautions Keep locked up and out of reach of children. Avoid contact with incompatible materials,

static, moisture, and flames. Good housekeeping and engineering practices should be employed to prevent the generation and accumulation of dusts. Keep the product in its

original container in a well ventilated and fresh place.

**Storage Class** Unspecified storage.

7.3 Specific End Use(s)

**Specific End Use(s)** The identified uses for this product are detailed in Section 1.2.

**Usage Description** Use only according to directions.

# SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

#### **8.1 Control Parameters**

Component	STD	TWA (8 Hrs)		STEL (15mins)		Notes
nickel	WEL		1mg/m3		3mg/m3	Nickel, organic compounds (as Ni).
nickel	NIOSH		0.015mg/m3			Nickel, metal - total dust.
cobalt	NIOSH		0.05mg/m3			Cobalt metal dust and fume (as Co).
cobalt	WEL		0.1mg/m3			Cobalt and compounds (as Co)
chromium	NIOSH		0.5mg/m3			chromium metal and chromium(II) and chromium(III) compounds.
chromium	WEL		0.5mg/m3			Chromium and Cr(II); Cr(III) compounds

**Ingredient Comments** 

No information available.

## **8.2 Exposure Controls**

**Protective Equipment** 







**Engineering Measures** 

Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Use with adequate explosion-proof ventilation designed to handle metal particulates.

**Respiratory Equipment** 

Where risk assessment shows air-purifying respirators are appropriate a full face respirator conforming to EN 143 should be used, and suitable respirator cartridges as a backup to engineering controls. Use respiratory equipment with particle filter - Type P3.

 $Change \ filters \ frequently \ Use \ respiratory \ protection \ as \ specified \ by \ qualified \ professional \ if$ 

concentrations exceed the limits listed in Section 8.

Hand Protection Use suitable protective gloves if there is a risk of skin contact. Suggested material: Protect

hands with category III (ref. Directive 89/686/EEC and standard EN 374) work gloves, made

of PVA, butyl, or fluoroelastomer. Consult manufacturer for specific advice.

Selection of the glove material depends on consideration of the penetration times, rates of diffusion and degradation, and concentration specific to the workplace. Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe:

EN374) is recommended.

Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with

applicable laws and good laboratory practices. Change gloves regularly.

**Eye Protection** Wear safety goggles or face shield to prevent any possibility of eye contact. Use equipment

for eye protection tested and approved under appropriate government standards such as EN

166(EU).

**Other Protection** Wear appropriate clothing to prevent any possibility of skin contact. Suggested PPE: Fire

resistant cotton or equivalent full-length overalls with electrically conductive safety shoes or

grounding straps.

Caution is required to avoid contact with unprotected electrical devices when wearing conductive safety shoes or grounding straps. Protective clothing should be selected based on the task being performed and the risks involved and should be approved by a specialist

before handling this product.

**Hygiene Measures** Observe normal hygiene standards. Keep container tightly closed. Do not eat, drink, or

smoke while using this product. Immediately take off any contaminated clothing and launder before re-use. Wash hands and / or face before breaks and at the end of the shift. After work,

wash the skin and apply skin cream.

**Process Conditions** Ensure that eye flushing systems and safety showers are located close by in the work place.

## **SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

## 9.1 Information on Basic Physical and Chemical Properties

AppearancePowder.ColourGrey.OdourOdourless.

Odour Threshold - Lower No information available.

**Odour Threshold - Upper**No information available.

**pH-Value, Conc. Solution** No information available.

**pH-Value, Diluted Solution** No information available.

**Melting Point** Melting Point (C): >1000.

**Initial Boiling Point and Boiling** 

Range

No information available.

Flash Point No information available.

**Evaporation Rate** No information available.

Flammability State No information available.

**Flammability Limit - Lower(%)** No information available.

Flammability Limit - Upper(%) No information available.

**Vapour Pressure** No information available.

Vapour Density (air=1) No information available.

**Relative Density** No information available.

**Bulk Density** No information available.

**Solubility** Insoluble.

**Decomposition Temperature** No information available.

Partition Coefficient; n-

Octanol/Water

No information available.

**Auto Ignition Temperature (°C)** No information available.

Viscosity No information available.

**Explosive Properties** No information available.

Oxidising Properties No information available.

9.2 Other Information

Molecular Weight No information available.

**Volatile Organic Compound**No information available.

**Other Information** Grey metallic powder < 1.0 mm. Density: 4 - 6 g/cm3.

## **SECTION 10: STABILITY AND REACTIVITY**

10.1 Reactivity

**Reactivity** Stable product under recommended storage and handling conditions.

10.2 Chemical Stability

Stability Stable product under recommended storage and handling conditions.

10.3 Possibility of Hazardous Reactions

**Hazardous Reactions** Dust clouds may be explosive. Iron will react with oxidising materials, fluorine, chlorine,

chlorine trifluoride, and hydrogen peroxide. Chromium will react with bromine

pentafluoride

Finely divided chromium will react with carbon dioxide, nitrogen oxides, sulphur dioxide.

Contact with acids can generate explosive gasses, e.g. hydrogen.

Hazardous PolymerisationWill not polymerise.Polymerisation DescriptionNot applicable.

10.4 Conditions to Avoid

Conditions to Avoid High temperatures and humid conditions can cause oxide formation and / or rust on the

particle surfaces.

10.5 Incompatible Materials

Materials to Avoid Avoid strong oxidising agents, bases, strong acids. See section 10.3.

10.6 Hazardous Decomposition Products

Hazardous Decomposition Products Decomposition of this product may yield metallic oxides. If heated, harmful vapours may be

formed.

## **SECTION 11: TOXICOLOGICAL INFORMATION**

#### 11.1 Information on Toxicological Effects

**Toxicological Information** No toxicological information for the overall finished product. Inhalation of metal fumes may

cause metal fume fever.

Acute Toxicity (Oral LD50) Silicon:Rat: 3160 mg/kg. Nickel:Rat: >9000 mg/kg. Iron: Rat: 984 mg/kg. Cobalt: Rat 6170

mg/kg.

Acute Toxicity (Dermal LD50) No information available.
Acute Toxicity (Inhalation LD50) Cobalt: Rat >10 mg/L/1H.

**Serious Eye Damage/Irritation** Product is not classified as an eye irritant, however high dust levels in air may cause eye

irritation.

**Skin Corrosion/Irritation**No information available.

**Respiratory Sensitisation**Cobalt: Repeated exposure may cause allergic respiratory reaction (asthma). Nickel: May

result in allergic lung sensitization reactions.

**Skin Sensitisation** Cobalt: Prolonged and/or repeated contact may cause irritation and/or dermatitis. May cause

skin sensitization. Nickel: Allergic skin sensitization reactions are the most frequent effect of

exposure.

Germ Cell Mutagenicity Genotoxicity - In Vitro Genotoxicity - In Vivo

Carcinogenicity Nickel is a possible human carcinogen. Chromium: May cause cancers of the lungs, nasal

cavity and paranasal sinuses.

Specific Target Organ Toxicity - Single Exposure:

**STOT - Single Exposure** No information available.

**Specific Target Organ Toxicity - Repeated Exposure:** 

**STOT - Repeated Exposure**No information available.

**Inhalation** Inhalation can cause asthma like symptoms.

**Ingestion** Ingestion may cause gastrointestinal irritation with nausea, vomiting and diarrhea.

**Skin Contact** Can cause mechanical irritation or allergic skin reaction.

**Eye Contact** Dust can cause mechanical irritation.

Waste Management When handling waste, consideration should be made to the safety precautions applying to

handling of the product.

**Routes of Entry** No information available.

Target Organs Skin. Respiratory system, lungs. Effects of overexposure to cobalt include lung effects

(irritation, fibrosis, asthma), cardiovascular effects (cardiomyopathy), liver and kidney congestion. Industrial exposure to chromium may cause dermatitis, skin ulcers, perforation of the nasal septum, as well as cancers of the lungs, nasal cavity and paranasal sinuses. Chronic inhalation of iron has resulted in mottling of the lungs, a condition referred to as siderosis. This is considered benign pneumoconiosis and does not ordinarily cause significant physiologic impairment. Systemic effects from ingestion of nickel salts include capillary damage, kidney damage, myocardial weakness and central nervous system depression.

**Aspiration Hazards:** No information available. **Reproductive Toxicity:** No information available.

## **SECTION 12: ECOLOGICAL INFORMATION**

## 12.1 Toxicity

**Ecotoxicity** No Ecological information on the finished product.

**Eco Toxilogical Information** Not classified as dangerous for the environment according to the criteria of Regulation (EC)

No 1272/2008.

#### 12.2 Persistence and Degradability

DegradabilityNo information available.Biological Oxygen DemandNo information available.Chemical Oxygen DemandNo information available.

12.3 Bioaccumulative Potential

Bioaccumulative Potential No data available on bioaccumulation.

Bioacculmation Factor

Partition Coefficient: n- No information available.

Octanol/Water

# 12.4 Mobility in Soil

**Mobility** No information available.

#### 12.5 Results of PBT and vPvB Assessment

Results of PBT and vPvB Assessment No information available.

## 12.6 Other Adverse Effects

Other Adverse Effects No information available.

## **SECTION 13: DISPOSAL CONSIDERATIONS**

Waste Management When handling waste, consideration should be made to the safety precautions applying to

handling of the product.

#### 13.1 Waste Treatment Methods

**Disposal Methods** Dispose of waste and residues in accordance with local authority requirements.

# **SECTION 14: TRANSPORT INFORMATION**

#### 14.1 UN Number

UN No. (ADR)

UN No. (IMDG)

Not applicable.

UN No. (IATA)

Not applicable.

# 14.2 UN Proper Shipping Name

ADR Proper Shipping Name

IMDG Proper Shipping Name

Not applicable.

IATA Proper Shipping Name

Not applicable.

## 14.3 Transport Hazard Class(es)

ADR Class Not applicable.

IMDG Class Not applicable.

IATA Class Not applicable.

Transport Labels Not applicable

## 14.4 Packing Group

ADR/RID/ADN Packing Group

IMDG Packing Group

IATA Packing Group

Not applicable.

Not applicable.

Not applicable.

## 14.5 Environmental Hazards

 ADR
 No

 IMDG
 No

 IATA
 No

# 14.6 Special Precautions for User

EMSNot applicable.Emergency Action CodeNot applicable.Hazard No. (ADR)Not applicable.Tunnel Restriction CodeNot 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

EU Legislation Regulation (EC) No 1272/2008 of the European Parliament and of the

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation

(EC) No 1907/2006 with amendments. The UN Globally Harmonized System (GHS) Safety Data Sheet format (Annex IV) is implemented as Annex II of REACH EU No 453/2010 of 20th

May 2010 amending regulation (EC) No 1907/2006.

**Approved Code of Practice** Workplace Exposure Limits Guidance Note EH40/2005.

Chemical Safety Assessment No chemical safety assessment has been carried out.

## **SECTION 16: OTHER INFORMATION**

**General Information** This Safety Data Sheet is in accordance with Reach Regulation (EC) No 453/2010.

**Revision Comments** This is a first issue.

**Revision Date** 05/08/2016

Revision

Safety Data Sheet Status Approved.

## **Hazard Statements In Full**

H317 May cause an allergic skin reaction H351 Suspected of causing cancer [\*].

H372 Causes damage to organs [\*] through prolonged or repeated exposure [\*].
 H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H413 May cause long lasting harmful effects to aquatic life.
EUH208 Contains [\*]. May produce an allergic reaction

#### Disclaimer

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