

SAFETY DATA SHEET

Stainless Steel 17-4PH (1.4542)

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

1.1. Product identifier

Trade name

Stainless Steel 17-4PH (1.4542)

Other names / Synonyms

Document No.: H-5800-6817-01-A_EN

Product no.

A-5771-0408

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

Relevant identified uses of the substance or mixture

Metal powder for additive layer manufacture

Uses advised against

None known.

1.3. Details of the supplier of the safety data sheet

Company and address

Renishaw plc

New Mills

Wotton-under-Edge,

GL12 8JR, Gloucestershire,

United Kingdom

+44 (0) 1453 524524

www.renishaw.com

E-mail

msds@renishaw.com

Revision

07/03/2023

SDS Version

1.0

1.4. Emergency telephone number

Contact The National Poisons Information Service (dial 111, 24 h service).

See section 4 "First aid measures".

Emergency contact from supplier: +44 (0) 1453 524524 (UK office hours 08:00 to 17:00 UTC Monday to Thursday, 08:00 to 16:00 Friday)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Skin Sens. 1; H317, May cause an allergic skin reaction.

Carc. 2; H351, Suspected of causing cancer.

STOT RE 2; H373, May cause damage to organs through prolonged or repeated exposure.

Aquatic Chronic 3; H412, Harmful to aquatic life with long lasting effects.

2.2. Label elements

Hazard pictogram(s)



Signal word

Warning

Hazard statement(s)

May cause an allergic skin reaction. (H317)

Suspected of causing cancer. (H351)

May cause damage to organs through prolonged or repeated exposure. (H373)
 Harmful to aquatic life with long lasting effects. (H412)

Safety statement(s)

General

-

Prevention

Obtain special instructions before use. (P201)

Do not breathe dust. (P260)

Wear eye protection/protective gloves/protective clothing. (P280)

Response

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

Get medical advice/attention if you feel unwell. (P314)

Storage

-

Disposal

Dispose of contents/container in accordance with local regulation. (P501)

Hazardous substances

Nickel

Additional labelling

Not applicable.

2.3. Other hazards

May form explosible dust-air mixture if dispersed.

Additional warnings

May form combustible dust concentrations in air.

This mixture/product does not contain any substances considered to meet the criteria classifying them as PBT and/or vPvB.

This product does not contain any substances considered to be endocrine disruptors in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable. This product is a mixture.

3.2. Mixtures

| Product/substance | Identifiers | % w/w | Classification | Note |
|-------------------|---|--------|---|----------|
| Iron | CAS No.: 7439-89-6 EC No.: 231-096-4 UK-REACH: Index No.: | 60-80% | | |
| Chromium | CAS No.: 7440-47-3 EC No.: 231-157-5 UK-REACH: Index No.: | 15-25% | | |
| Nickel | CAS No.: 7440-02-0 EC No.: 231-111-4 UK-REACH: Index No.: 028-002-00-7 | 5-10% | Skin Sens. 1, H317 Carc. 2, H351 STOT RE 1, H372 Aquatic Chronic 3, H412 | [1], [3] |
| Copper | CAS No.: 7440-50-8 EC No.: 231-159-6 UK-REACH: Index No.: | 5-10% | Aquatic Acute 1, H400 (M=1) Aquatic Chronic 2, H411 | |

See full text of H-phrases in section 16. Occupational exposure limits are listed in section 8, if these are available.

Other information

[1] European occupational exposure limit.

[3] According to UK REACH, Annex XVII, the substance is subject to restrictions.

SECTION 4: First aid measures

4.1. Description of first aid measures

General information

In the case of accident: Contact a doctor or casualty department – take the label or this safety data sheet. Contact a doctor if in doubt about the injured person's condition or if the symptoms persist. Never give an unconscious person water or other drink.

Inhalation

Upon breathing difficulties or irritation of the respiratory tract: Bring the person into fresh air and stay with him/her.

Skin contact

Remove contaminated clothing and shoes immediately. Ensure to wash exposed skin thoroughly with water and soap. Skin cleanser can be used. DO NOT use solvents or thinners.

If skin irritation occurs: Get medical advice/attention.

Eye contact

Upon irritation of the eye: Remove contact lenses and open eyes widely. Flush eyes with water or saline water (20-30 °C) for at least 5 minutes. Seek medical assistance and continue flushing during transport.

Ingestion

If the person is conscious, rinse the mouth with water and stay with the person. Never give the person anything to drink.

In case of malaise, seek medical advice immediately and bring the safety data sheet or label from the product. Do not induce vomiting, unless recommended by the doctor. Have the person lean forward with head down to avoid inhalation of or choking on vomited material.

Burns

Not applicable.

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

Sensitisation: This product contains substances, which may trigger allergic reaction upon dermal contact.

Manifestation of allergic reactions typically takes place within 12-72 hours after exposure.

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

IF exposed or concerned:

Get immediate medical advice/attention.

If skin irritation or rash occurs: Get medical advice/attention.

Information to medics

Bring this safety data sheet or the label from this product.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: Use class D extinguishing agents on dust, fines or molten metal.

Unsuitable extinguishing media: Water, foam, halogenated extinguishing agents.

5.2. Special hazards arising from the substance or mixture

Explosion: Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

Fire will result in dense smoke. Exposure to combustion products may harm your health. Closed containers, which are exposed to fire, should be cooled with water. Do not allow fire-extinguishing water to enter the sewage system and nearby surface waters.

If the product is exposed to high temperatures, e.g. in the event of fire, dangerous decomposition compounds are produced. These are:

Some metal oxides

5.3. Advice for firefighters

Wear self-contained breathing apparatus and protective clothing to prevent contact. Upon direct exposure contact The National Poisons Information Service (dial 111, 24 h service) in order to obtain further advice.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

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.

Avoid direct contact with spilled substances.

Evacuate surrounding areas.

Eliminate all ignition sources.
Ventilate the area.
Wear appropriate personal protective equipment (see section 8).

6.2. Environmental precautions

Avoid discharge to lakes, streams, sewers, etc. In the event of leakage to the surroundings, contact local environmental authorities.

6.3. Methods and material for containment and cleaning up

Collect spills carefully. Moist the material with water in order to prevent the formation and propagation of dust. Wherever possible cleaning should be performed with normal cleaning agents. Avoid use of solvents. Use spark-proof tools and explosion-proof equipment.

Avoid dust generation.

Ensure that waste and contaminated materials are collected and removed from the work area as soon as possible in a suitably labelled container.

6.4. Reference to other sections

See section 13 "Disposal considerations" on handling of waste.

See section 8 "Exposure controls/personal protection" for protective measures.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces.

It is recommended to install waste collection trays in order to prevent emissions to the waste water system and surrounding environment.

Avoid direct contact with the product.

Smoking, drinking and consumption of food is not allowed in the work area.

See section 8 "Exposure controls/personal protection" for information on personal protection.

Take precautionary measures against static discharges.

7.2. Conditions for safe storage, including any incompatibilities

Containers that have been opened must be carefully resealed and kept upright to prevent leakage.

Powder trickling out onto the floor or onto other containers must be prevented.

Avoid the suspension of dust in the air.

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Use non-sparking tools.

Recommended storage material

Always store in containers of the same material as the original container.

Storage temperature

Store in tightly closed original container in a dry, cool and well-ventilated place.

Store in accordance with local regulations.

Incompatible materials

Strong acids, strong bases, strong oxidizing agents, and strong reducing agents.

7.3. Specific end use(s)

This product should only be used for applications quoted in section 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Chromium

Long term exposure limit (8 hours) (mg/m³): 0,5 (as Cr)

Nickel

Copper

Long term exposure limit (8 hours) (mg/m³): 0,2(fume)/1(dust)

Short term exposure limit (15 minutes) (mg/m³): 2 (dusts, mists)

The Control of Substances Hazardous to Health Regulations 2002. SI 2002/2677 The Stationery Office 2002.
EH40/2005 Workplace exposure limits (Fourth Edition 2020).

DNEL

No data available.

PNEC

No data available.

8.2. Exposure controls

Compliance with the given occupational exposure limits values should be controlled on a regular basis. Where necessary use lighting and electrical equipment designed for use in atmospheres where flammable vapours or dusts are present, and which can direct static electricity by grounding equipment.

General recommendations

When transferring the materials, dust clouds should be kept at an absolute minimum. Handling should be slow and deliberate. The materials should be transferred from one container to another using a non-sparking, conductive metal scoop.

When mixing the material with other dry ingredients, frictional heat should be avoided. The best type of mixer for a dry mixing operation is one that contains no moving parts, but rather affects a tumbling action, such as a conical blender. Introduction of an inert atmosphere in the blender is highly recommended since dust clouds are generated. All equipment must be well grounded.

Smoking, drinking and consumption of food is not allowed in the work area.

Exposure scenarios

There are no exposure scenarios implemented for this product.

Exposure limits

Professional users are subjected to the legally set maximum concentrations for occupational exposure. See occupational hygiene limit values above.

Appropriate technical measures

Do not recirculate outlet air that contain the substances.

Hygiene measures

In between use of the product and at the end of the working day all exposed areas of the body must be washed thoroughly. Always wash hands, forearms and face.

Measures to avoid environmental exposure


Keep damming materials near the workplace. If possible, collect spillage during work.

Individual protection measures, such as personal protective equipment


Generally

Use only UKCA marked protective equipment.


Respiratory Equipment

| Type | Class | Colour | Standards | |
|------|-------|--------|-----------|---|
| SL | P3 | White | EN149 |  |


Skin protection

| Recommended | Type/Category | Standards | |
|--------------|---------------|--------------|---|
| Safety shoes | | EN ISO 20345 |  |

Hand protection

| Material | Glove thickness (mm) | Breakthrough time (min.) | Standards | |
|----------|----------------------|--------------------------|-------------------------|---|
| Butyl | 0,3 | > 480 | EN374-2, EN374-3, EN388 |  |

Eye protection

| Type | Standards | |
|-----------------------------------|-----------|---|
| Safety glasses with side shields. | EN166 |  |

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state

Powder

Colour

Gray

| | |
|---|--|
| Odour / Odour threshold | None |
| pH | Not applicable - product is a solid |
| Density (g/cm ³) | 7.76 |
| Relative density | Not applicable - product is a solid |
| Kinematic viscosity | Not applicable - product is a solid |
| Particle characteristics | Particle size: 100% <1 mm |
| Phase changes | |
| Melting point/Freezing point (°C) | 1440 |
| Softening point/range (waxes and pastes) (°C) | Does not apply to solids. |
| Boiling point (°C) | No information available as testing has not been completed. |
| Vapour pressure | Testing not relevant or not possible due to the nature of the product. |
| Relative vapour density | Does not apply to solids. |
| Decomposition temperature (°C) | No information available as testing has not been completed. |
| Data on fire and explosion hazards | |
| Flash point (°C) | Does not apply to solids. |
| Flammability (°C) | Testing not relevant or not possible due to nature of the product. |
| Auto-ignition temperature (°C) | Testing not relevant or not possible due to nature of the product. |
| Lower and upper explosion limit (% v/v) | Does not apply to solids. |
| Solubility | |
| Solubility in water | Insoluble |
| n-octanol/water coefficient | No information available as testing has not been completed. |
| Solubility in fat (g/L) | No information available as testing has not been completed. |
| 9.2. Other information | |
| Formation of explosible dust/air mixtures | Yes |
| Evaporation rate (n-butylacetate = 100) | Not applicable - product is a solid |
| Other physical and chemical parameters | No data available. |

SECTION 10: Stability and reactivity

- 10.1. Reactivity
No data available.
- 10.2. Chemical stability
The product is stable under the conditions, noted in section 7 "Handling and storage".
- 10.3. Possibility of hazardous reactions
None known.
- 10.4. Conditions to avoid
Avoid the suspension of dust in the air.
- 10.5. Incompatible materials

Strong acids, strong bases, strong oxidizing agents, and strong reducing agents.

10.6. Hazardous decomposition products

The product is not degraded when used as specified in section 1.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008 as retained and amended in UK law

Acute toxicity

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

Skin corrosion/irritation

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

Serious eye damage/irritation

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

Respiratory sensitisation

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

Skin sensitisation

May cause an allergic skin reaction.

Germ cell mutagenicity

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

Carcinogenicity

Suspected of causing cancer.

Reproductive toxicity

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

STOT-single exposure

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

STOT-repeated exposure

May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard

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

11.2. Information on other hazards

Long term effects

Carcinogenic effects: This product contains substances considered or proven to be carcinogenic. The carcinogenic effects may be triggered subsequent to exposure through inhalation, skin contact or ingestion.

Endocrine disrupting properties

Not applicable.

Other information

Chromium has been classified by IARC as a group 1 carcinogen.

Nickel has been classified by IARC as a group 2B carcinogen.

Exposure to metal dusts and oxides may cause metal fume fever. Metal fume fever is a temporary flu-like condition characterized by chills, fever, muscle aches and pains, nausea, and vomiting. Typically, the symptoms appear within a few hours after exposure and subside within 2-3 days with no permanent effects.

SECTION 12: Ecological information

12.1. Toxicity

No data available.

12.2. Persistence and degradability

No data available.

12.3. Bioaccumulative potential

No data available.

12.4. Mobility in soil

No data available.

12.5. Results of PBT and vPvB assessment

This mixture/product does not contain any substances considered to meet the criteria classifying them as PBT and/or vPvB.

12.6. Endocrine disrupting properties

Not applicable.

12.7. Other adverse effects

This product contains substances that are toxic to the environment. May result in adverse effects to aquatic organisms.

This product contains substances, which may cause adverse long-term effects to the aquatic environment.

SECTION 13: Disposal considerations

Waste treatment methods

Product is covered by the regulations on hazardous waste.
 HP 5 - Specific Target Organ Toxicity (STOT)/Aspiration Toxicity
 HP 7 - Carcinogenic
 HP 14 - Ecotoxic
 Dispose of contents/container to an approved waste disposal plant.
 Regulation (EU) No 1357/2014 of 18 December 2014 on waste as retained and amended in UK law.

EWC code

Not applicable.

Specific labelling

Not applicable.

Contaminated packing

Packaging containing residues of the product must be disposed of similarly to the product.

SECTION 14: Transport information

| | 14.1 UN / ID | 14.2 UN proper shipping name | 14.3 Hazard class(es) | 14.4 PG* | 14.5 Env** | Other information: |
|------|-----------------|---------------------------------|--------------------------|-------------|---------------|-----------------------|
| ADR | - | - | - | - | - | - |
| IMDG | - | - | - | - | - | - |
| IATA | - | - | - | - | - | - |

* Packing group

** Environmental hazards

Additional information

Not dangerous goods according to ADR, IATA and IMDG.

14.6. Special precautions for user

Not applicable.

14.7. Maritime transport in bulk according to IMO instruments

No data available.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Restrictions for application

Restricted to professional users.
 People under the age of 18 shall not be exposed to this product.
 Pregnant women and women breastfeeding must not be exposed to this product. The risk, and possible technical precautions or design of the workplace needed to eliminate exposure, must be considered.

Demands for specific education

No specific requirements.

SEVESO - Categories / dangerous substances

Nickel

UK-REACH, Annex XVII

Nickel is subject to restrictions, UK-REACH annex XVII (entry 27).

Additional information

Not applicable.

Sources

The Management of Health and Safety at Work Regulations 1999.
 The Health and Safety at Work etc. Act 1974 Regulations 2013.
 Control of Major Accident Hazards (COMAH) Regulations 2015.
 Regulation (EU) No 1357/2014 of 18 December 2014 on waste as retained and amended in UK law.
 Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP) as retained and amended in UK law.
 Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as retained and amended in UK law.

15.2. Chemical safety assessment

No

SECTION 16: Other information

Full text of H-phrases as mentioned in section 3

H317, May cause an allergic skin reaction.

H351, Suspected of causing cancer.

H372, Causes damage to organs through prolonged or repeated exposure.

H400, Very toxic to aquatic life.

H411, Toxic to aquatic life with long lasting effects.

H412, Harmful to aquatic life with long lasting effects.

Abbreviations and acronyms

ADN = European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterway

ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road

ATE = Acute Toxicity Estimate

BCF = Bioconcentration Factor

CAS = Chemical Abstracts Service

CE = Conformité Européenne

CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]

CSA = Chemical Safety Assessment

CSR = Chemical Safety Report

DMEL = Derived Minimal Effect Level

DNEL = Derived No Effect Level

EINECS = European Inventory of Existing Commercial chemical Substances

ES = Exposure Scenario

EUH statement = CLP-specific Hazard statement

EWC = European Waste Catalogue

GHS = Globally Harmonized System of Classification and Labelling of Chemicals

IARC = International Agency for Research on Cancer (IARC)

IATA = International Air Transport Association

IBC = Intermediate Bulk Container

IMDG = International Maritime Dangerous Goods

LogPow = logarithm of the octanol/water partition coefficient

MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)

OECD = Organisation for Economic Co-operation and Development

PBT = Persistent, Bioaccumulative and Toxic

PNEC = Predicted No Effect Concentration

RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail

RRN = REACH Registration Number

SCL = A specific concentration limit

SVHC = Substances of Very High Concern

STOT-RE = Specific Target Organ Toxicity - Repeated Exposure

STOT-SE = Specific Target Organ Toxicity - Single Exposure

TWA = Time weighted average

UN = United Nations

UVBC = Unknown or variable composition, complex reaction products or of biological materials

VOC = Volatile Organic Compound

vPvB = Very Persistent and Very Bioaccumulative

Additional information

The classification of the substance/mixture in regard of health hazards are in accordance with the calculation methods given by Regulation (EC) No. 1272/2008 (CLP) as retained and amended in UK law.

The classification of the substance/mixture in regard of environmental hazards are in accordance with the calculation methods given by Regulation (EC) No. 1272/2008 (CLP) as retained and amended in UK law.

The safety data sheet is validated by

EcoOnline

Other

A change (in proportion to the last essential change (first cipher in SDS version, see section 1)) is marked with a blue triangle.

The information in this safety data sheet applies only to this specific product (mentioned in section 1) and is not necessarily correct for use with other chemicals/products.

It is recommended to hand over this safety data sheet to the actual user of the product. Information in this safety

data sheet cannot be used as a product specification.
Country-language: GB-en