SAFETY DATA SHEET

Stainless Steel 17-4PH (1.4542)

SECTION 1: Identification

1.1. Product identifier

Trade name

Stainless Steel 17-4PH (1.4542)

Other names / Synonyms

Document No.: H-5800-6812-01-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

SDS date

3/7/2023

SDS Version

1.0

1.4. Emergency telephone number

Contact the poison control at 1-800-222-1222 (24/7) or use the webPOISONCONTROL® (triage.webpoisoncontrol.org) to get specific guidance for your case
See also 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: Hazard(s) identification

OSHA/HCS status

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

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

2.2. Label elements

Hazard pictogram(s)

Signal word

Danger

Hazard statement(s)

May cause an allergic skin reaction. (H317)
Suspected of causing cancer. (H351)
Causes damage to organs through prolonged or repeated exposure. (H372)

Safety statement(s)

General

-

Prevention

Obtain special instructions before use. (P201)
Do not breathe dust. (P260)
Contaminated work clothing should not be allowed out of the workplace. (P272)
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)
If skin irritation or rash occurs: Get medical advice/attention. (P333+P313)
Take off contaminated clothing and wash it before reuse. (P362+P364)

Storage

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Disposal

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

Additional labelling

Not applicable.

2.3. Other hazards

Additional warnings

This mixture/product does not contain any substances considered to meet the criteria classifying them as PBT and/or vPvB.
May form explosible dust-air mixture if dispersed.

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	60-80%		
Chromium	CAS No.: 7440-47-3	15-25%		
Nickel	CAS No.: 7440-02-0	5-10%	Skin Sens. 1, H317 Carc. 2, H351 STOT RE 1, H372	
Copper	CAS No.: 7440-50-8	5-10%		

Where the concentration of an ingredient is expressed as a range the exact concentration has been withheld as a trade secret.

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

Other information

None known.

SECTION 4: First-aid measures

4.1. Description of first aid measures

General information

If breathing is irregular, drowsiness, loss of consciousness or cramps: Call 911 and give immediate treatment (first aid).
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

None known.

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

None known.

Information to medics

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

SECTION 5: Fire-fighting measures

5.1. Extinguishing media

Suitable extinguishing media: Alcohol-resistant foam, carbon dioxide, powder, water mist.
Unsuitable extinguishing media: Waterjets should not be used, since they can spread the fire.
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 Poison Help Line on 1-800-222-1222 (24/7) 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.

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.
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 (OSHA Table Z-1) (mg/m³): 1 (metal and insol. salts)
Long term exposure limit (ACGIH TLV) (mg/m³): 0.5 (metal, inhalable)
Long term exposure limit (NIOSH REL) (mg/m³): 0.5

Nickel
Long term exposure limit (OSHA Table Z-1) (mg/m³): 1
Long term exposure limit (ACGIH TLV) (mg/m³): elemental: 1.5 (Inhalable); insoluble inorganic compounds: 0.2 (Inhalable) / soluble inorganic compounds: 0.1 (Inhalable)
Long term exposure limit (NIOSH REL) (mg/m³): Potential occupational carcinogen; 0.015

Copper
Long term exposure limit (OSHA Table Z-1) (mg/m³): 0,1 (Fume (as Cu))
Long term exposure limit (ACGIH TLV) (mg/m³): 0.2 (Fume (as Cu)) / 1 (Dusts and mists (as Cu))
Long term exposure limit (NIOSH REL) (mg/m³): 0.1 (Fume (as Cu)) / 1(Dusts and mists (as Cu))

Part 1910 - Occupational Safety and Health Standards (29 CFR 1910.1000 TABLE Z-1 - Limits for Air Contaminants)

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

Airborne gas and dust concentrations must be kept at a minimum and below current limit values (see above). Installation of a local exhaust system if normal air flow in the work room is not sufficient is recommended. Ensure emergency eyewash and showers are clearly marked.

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 protective equipment with a recognized certification mark, e.g. the UL mark.

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

None

Odour threshold (ppm)

Testing not relevant or not possible due to the nature of the product.

pH

Not applicable - product is a solid

Density (g/cm³)

7.76

Relative density
Not applicable - product is a solid
Kinematic viscosity
Not applicable - product is a solid
Phase changes
Melting point (°F)
-
Melting point (°C)
1440
Boiling point (°F)
No information available as testing has not been completed.
Vapour pressure
Testing not relevant or not possible due to the nature of the product.
Vapour density
Does not apply to solids.
Decomposition temperature (°F)
No information available as testing has not been completed.
Evaporation rate (n-butylacetate = 100)
Not applicable - product is a solid
Data on fire and explosion hazards
Flash point (°F)
Does not apply to solids.
Flammability (°F)
Testing not relevant or not possible due to nature of the product.
Auto-ignition temperature (°F)
Testing not relevant or not possible due to nature of the product.
Explosion limits (% 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 toxicological effects

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
Causes damage to organs through prolonged or repeated exposure.

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

Long term effects
None known.

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. Other adverse effects
None known.

SECTION 13: Disposal considerations

RCRA Hazardous waste ("P" and "U" list) (40 CFR 261)
None of the components are listed

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:
DOT	-	-	-	-	-	-
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. Transport in bulk according to Annex II of Marpol and the IBC Code

No data available.

SECTION 15: Regulatory information

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

15.2. U.S. Federal regulations

TSCA

Iron is listed in the non-confidential portion
Chromium is listed in the non-confidential portion
Nickel is listed in the non-confidential portion
Copper is listed in the non-confidential portion

Clean Air Act

Chromium is regulated as a hazardous air pollutant (HAPS)
Nickel is regulated as a hazardous air pollutant (HAPS)

EPCRA Section 302

None of the components are listed

EPCRA Section 304

None of the components are listed

EPCRA section 313

Chromium is listed
Nickel is listed
Copper is listed

CERCLA

Chromium is regulated with a Reportable Quantity (RQ) of: 5000 pounds
Nickel is regulated with a Reportable Quantity (RQ) of: 100 pounds
Copper is regulated with a Reportable Quantity (RQ) of: 5000 pounds

State regulations

California / Prop. 65

Nickel is known to cause: Cancer

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Massachusetts / Right To Know Act

Chromium is listed
Nickel is listed
Copper is listed

New Jersey / Right To Know Act

Chromium / Substance number: 0432
Chromium is on the Special Health Hazard Substance List

—

Nickel / Substance number: 1341
Nickel is on the Special Health Hazard Substance List

—

Copper / Substance number: 0528

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New York / Right To Know Act

Chromium is listed
Chromium is regulated with a Reportable Quantity (RQ) of: 5000* pounds
Chromium is regulated with a Treshold Reporting Quantity (TRQ) of: 0 pounds

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Nickel is listed
Nickel is regulated with a Reportable Quantity (RQ) of: 100 pounds
Nickel is regulated with a Treshold Reporting Quantity (TRQ) of: 0 pounds

—

Copper is listed
Copper is regulated with a Reportable Quantity (RQ) of: 5000* pounds
Copper is regulated with a Treshold Reporting Quantity (TRQ) of: 100 pounds

—

Pennsylvania / Right To Know Act

Chromium is listed
Chromium is a special hazardous substance (S)
Chromium is hazardous to the environment (E)

—

Nickel is listed
Nickel is a special hazardous substance (S)
Nickel is hazardous to the environment (E)

—

Copper is listed
Copper is hazardous to the environment (E)

—

15.4. Restrictions for application

Restricted to professional users.
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.

15.5. Demands for specific education

No specific requirements.

15.6. Additional information

Not applicable.

15.7. Chemical safety assessment

No

15.8. Sources

OSHA Hazard Communication Standard (29 CFR 1910.1200)

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.

The full text of identified uses as mentioned in section 1

None known.

Abbreviations and acronyms

ACGIH = American Conference of Governmental Industrial Hygienists
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
CERCLA = Comprehensive Environmental Response Compensation and Liability Act
EINECS = European Inventory of Existing Commercial chemical Substances
EPCRA = Emergency Planning and Community Right-To-Know Act
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
HCIS = Hazardous Chemical Information System
IARC = International Agency for Research on Cancer
IATA = International Air Transport Association
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)
NFPA = National Fire Protection Association
NIOSH = National Institute for Occupational Safety and Health
OECD = Organisation for Economic Co-operation and Development
OSHA = Occupational Safety and Health Administration

PBT = Persistent, Bioaccumulative and Toxic
RCRA = Resource Conservation and Recovery Act
RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail
RRN = REACH Registration Number
SARA = Superfund Amendments and Reauthorization Act
SCL = A specific concentration limit.
STEL = Short-term exposure limits
STOT-RE = Specific Target Organ Toxicity - Repeated Exposure
STOT-SE = Specific Target Organ Toxicity - Single Exposure
TSCA = The Toxic Substances Control Act
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 mixture in regard of health hazards is in accordance with the calculation methods given by HCS (29 CFR 1910.1200).

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: US-en