

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

1.1 Product Identifier (s)

Product Name: Nickel and Nickel Alloy(s)
 Chemical Name: Metal Alloy(s)
 Chemical Family: Nickel(s)
 Synonyms: Wrought Nickel, Pure nickel, Nickel 300 (Permanickel)
 Trade Names/Alloy Designations: **99, 99.2, 99.6, 99FM, 200, 201, 205; 205LC, 205XLC, 206C, 206H, 208, 209, 211, 233; 300**

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

Metal Working- Bar, Rod, Wire & Strip

Use Descriptor system (REACH):

PC7: Base metals and alloys

1.3 Details of the Supplier of Safety Data Sheet

Company

Vista Metals, Inc
 65 Ballou Blvd
 Bristol, RI 02809
 Phone: 401-253-1772 Fax: 401-253-1806
<https://vismet.com/>

1.4 Emergency Telephone Number

Vista Metals: 401-253-1772 Association/Organization: INRS/ORFILA <http://www.centres-antipoison> Ph: +33 (0)1 45 42 59 59

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification with EC regulation No. 1272/2008 and its amendments

Skin Sensitivity-1 H317
 Carcinogenicity-2 H351
 STOT (repeated exposure)-1 H372

This substance does not present a physical hazard. Consult other references for additional products present on site. No known or foreseeable environmental damage under standard conditions of use.

Full text of hazard classes and H-statements: see Section 16.

2.2 Label Elements

In compliance with EC regulation No. 1272/2008 and its amendments

Hazard Pictograms (GHS)



Signal Word (GHS)

: Danger

Hazard Statements

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

Precautionary Statements (Prevention)

: P201- Obtain special instructions before use.
 P202- Do not handle until all safety precautions have been read and understood.
 P260- Do not breathe dust/fume/gas/mist/vapors/spray.
 P264- Wash.... Thoroughly after handling.
 P270- Do not eat, drink or smoke when using this product.
 P272- Contaminated work clothing should not be allowed out of the workplace.
 P280- Wear protective gloves/protective clothing/eye protection/face protection

Precautionary Statements (Response)

: P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
 P308 & P313- IF exposed or concerned: Get medical advice/attention.
 P314- Get medical advice/attention if you feel unwell.
 P333 & P313- If irritation or rash occurs, get medical advice/attention.

Precautionary Statements (Storage)

: P405- Store locked up.



Nickel & Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 001
 Revision Date: 01/2020 Date of Issue: 01/2020 | Version: 2.0

Precautionary Statements (Disposal) : P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other Hazards

- WARNING!** Exposure to dust or fumes can cause eye, skin, respiratory tract infection and flu-like illness. Inhalation or ingestion of dust or fumes can cause respiratory system damage. May cause an allergic skin reaction, and eye and mucous membrane irritation may occur. Contains materials that may cause cancer and/or nervous system effects. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. **Wash hands thoroughly after handling.**
- Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).
- The mixture does not contain substances classified as "Substances of Very High Concern" (SVHC) $\geq 0.1\%$ published by the European Chemicals Agency (ECHA) under article 57 of REACH: <http://echa.europa.edu/fr/candidate-list-table>
- This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.
- Hazards not otherwise classified (HNOC) Harmful to aquatic life with long lasting effects

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Composition of Component

Name	Product Identifier	%	GHS Classification & EC 1272/2008
Nickel	INDEX: 028-002-00-7 CAS: 7440-02-0 EC: 231-111-4	$50 \leq X < 100$	GHS08 • GHS07 • DGR • CARC. 2, H351 STOT RE 1, H372 • SKIN SENS. 1, H317

Full text of H-phrases, see Section 16

3.1.2 Base Metal & Alloying Elements:

Components	CAS Nbr	Exposure Limits			
			ACGIH TLV (mg/m3)		OSHA PEL (mg/m3)
Iron (Fe)	7439-89-6	5	Oxide Dust / Fume	10	Oxide Dust / Fume
Nickel (Ni)	7440-02-0	1.5	Metal	1	Metal and Insoluble Component
Chromium (Cr)	7440-47-3	0.5	Metals	1	Metal
Aluminum (Al)	7429-90-5	10 5	Dust Fume	15 5	Dust Respirable fraction
Boron (B)	7440-42-8	10	Oxide Dust	15	Oxide Dust
Carbon (C)	7440-44-0	-	Not Established	-	Not Established
Cobalt (Co)	7440-48-4	0.02	As Cobalt (A3 Carcinogen)	0.1	Metal / Dust / Fume
Copper (Cu)	7440-50-8	1 0.2	Dust Fume	1 0.1	Dust Fume
Lead (Pb)	7439-92-1	0.05	Dust/Fume (A3 Carcinogen)	0.05	Dust / Fume
Manganese(Mn)	7439-96-5	0.2	Elemental Mn & Inorganic Compounds	5	Insoluble Compounds
Molybdenum(Mo)	7439-98-7	10	Insoluble Compounds	15	Insoluble Compounds
Niobium (Nb)	7440-03-1	-	Not Established	-	Not Established
Phosphorous(P)	7723-14-0	0.1	Phosphorus	0.1	Phosphorus
Silicon (Si)	7440-21-3	10	Dust	15	Dust
Sulfur (S)	7446-09-05	5.2 13	Sulfur Dioxide Sulfur Dioxide (STEL)	13	Sulfur Dioxide
Titanium (Ti)	7440-32-6	-	Not Established	-	Not Established
Tungsten (W)	7440-33-7	5	Insoluble Compounds as W Insoluble Compounds as W (STEL)	-	Not Established
Vanadium (V)	7440-62-2	0.05	Oxide Dust / Fume	0.5 0.1	Oxide Dust (Ceiling) Oxide Fume (Ceiling)
Zinc (Zn)	7440-66-6	10 5 10	Oxide Dust Oxide Fume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust



Nickel & Nickel Alloys

Safety Data Sheet
Revision Date: 01/2020

Vista Metals' SDS Nbr: 001
Date of Issue: 01/2020 | Version: 2.0

Page | 3 of 9

SECTION 4: FIRST AID MEASURES

As a general rule, in case of any doubt or if symptoms persist, always call a doctor.

NEVER induce swallowing by an unconscious person.

4.1 Description of first aid measure:

General: As a general rule, in case of any doubt or if symptoms persist, always call a doctor.

NEVER induce swallowing by an unconscious person.

Inhalation: If inhaled, remove to fresh air and keep at rest in a comfortable breathing position. Get immediate medical attention if breathing difficulty persists or if person has stopped breathing.

Skin Contact: Remove contaminated clothing and wash skin with water and soap or recognized cleaner. Wash contaminated clothing before reuse. Watch out for any remaining product in skin, clothing, shoes, watches, etc. In the event of an allergic reaction, seek medical attention. If the contaminated area is widespread or there is damage to the skin, a doctor must be consulted or the patient transferred to hospital.

Eye Contact: Immediately rinse with water [eyes open] for at least 15 minutes. Remove contact lenses if present and easy to do- continue rinsing. If there is any redness, pain or visual impairment, obtain medical attention.

Ingestion: If swallowed, do not induce vomiting- seek medical attention immediately and bring label or this safety sheet.

4.2 Most important symptoms and effects, both acute and delayed

General: Skin sensitization. May cause cancer. Is suspected of damaging an unborn child. Under normal condition of use, this material is not anticipated to present a significant hazard. If metal dust is produced, it can cause irritation of the skin and respiratory tract and can be harmful.

Inhalation: If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Skin contact: Dust can get stuck in skin folds or by contact with tight clothing.

Eye Contact: Dust that is generated can get stuck in eye, along with slivers as well. Fumes, dust and slivers will most likely cause eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation.

Chronic Symptoms: May cause cancer. Is suspected of damaging an unborn child. Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).

4.3 Indication of any immediate medical attention and special treatment needed

In case of injury, make sure the person is up to date with anti-tetanus vaccine. If medical advice is necessary, bring label or safety sheet with you.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media: Non-flammable in massive form. Only dust generated by the processing of metal may be flammable. Do not use water when molten material is involved. The combination of hot product and water will result in an extreme explosion.

5.2 Special hazards arising from the substance or mixture: A fire will often produce a thick, black smoke. Exposure to decomposition byproducts may be hazardous to health. **DO NOT use water on molten metal: an explosion hazard could result. DO NOT BREATHE IN SMOKE!**

5.3 Advice for firefighters: Use self-contained breathing apparatus (NIOSH-approved) and full protective clothing must be worn in case of fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, protective equipment & emergency procedures:

- Consult the safety measures listed under sections 7 & 8.
- For non fire-fighters: Avoid any contact with the skin and eyes.
- For fire-fighters: Be equipped with suitable personal protective equipment (see section 8).

6.2 Environmental precautions:

- Prevent any material from entering drains or waterways.

6.3 Methods and material for containment and cleaning up:

- Retrieve the product by mechanical means [sweeping/vacuuming].
- Stop the flow of material if you are without risk.

6.4 Reference to other sections:

- For safety measures and personal protection, see sections 7 & 8.

SECTION 7: HANDLING AND STORAGE



Nickel & Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 001
 Revision Date: 01/2020 Date of Issue: 01/2020 | Version: 2.0

Requirements relating to storage remises apply to all facilities where the mixture is handled.

Individuals with a history of skin sensitization should not, under any circumstances, handle this mixture.

7.1 Precautions for safe handling:

- Always wash hands after handling.
- Remove and wash contaminated clothing before re-using.

Fire Prevention:

- Prevent access by unauthorized personnel.

Recommended equipment and procedures:

- For personal protection, see section 8.

Prohibited equipment and procedures:

- No smoking, eating or drinking in areas where the mixture is used.

7.2 Conditions for safe storage, including any incompatibilities:

- Store in dry and ventilated area.
- Do not store in a corrosive environment to avoid alloy's oxidation.
- Packaging: Always keep in packaging made of an identical material to the original.

7.3 Specific end use(s):

- No data available.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters:

Occupational exposure limits:

Nickel (7440-02-0)		
USA ACGIH	ACGIH TWA (mg/m ³)	1.5 mg/m ³ – as inhalable fraction
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.015 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	10mg Ni/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³

DNEL (Derived No Effect Level):

Nickel (7440-02-0)				
Workers	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	11.9 mg Ni/m ³	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	0.05mg Ni/m ³	
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²	
		Inhalation	0.05mg Ni/m ³	
	General Population	Acute- Systemic Effects	Dermal	No hazard identified
			Inhalation	No hazard identified
			Oral	0.37 mg Ni ion/kgbw/day
		Acute- Local Effects	Dermal	No hazard identified
Inhalation			0.8 mg Ni/m ³	
Long-term- Systemic Effects		Dermal	No hazard identified	
		Inhalation	0.00006mg Ni/m ³	
		Oral	0.011mg Ni/m ³	
Long-term- Local Effects		Dermal	0.035mg Ni/cm ²	
		Inhalation	0.00006mg Ni/m ³	



Nickel & Nickel Alloys

Safety Data Sheet
Revision Date: 01/2020

Vista Metals' SDS Nbr: 001
Date of Issue: 01/2020 | Version: 2.0

PNEC (Predicted No Effect Concentration):

Nickel (7440-02-0)	
Freshwater	7.1 µg/L
Marine Water	8.6 µg/L
Sewage Treatment	0.33 µg/L
Terrestrial Organisms	29.9 mg/kg soil dw
Predators (secondary poisoning)	0.12 mg/kg food

8.2 Exposure Controls

Personal Protection measures, such as personal protective equipment:

- Use personal protective equipment that is clean and has been properly maintained.
- Store personal protective equipment in a clean place, away from the work area.
- Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using.
- Ensure that there is adequate ventilation, especially in confined areas.

Eye/Face Protection:

- Avoid contact with eyes.
- Wearing glasses is recommended- especially before handling powders or dust emission in accordance with standard ANSI A87, EN 166

Hand Protection:

- Wear suitable protective gloves in the event of prolonged or repeated skin contact.
- Gloves must be selected according to the application and during use at the workstation.
- Use gloves that are resistant to chemical agents in accordance to standard EN ISO 374.
- Protective gloves need to be selected according to their suitability for the workstation in question: other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required. Cut-resistant gloves should be in accordance with standard EN 388 & EN 420

Body Protection:

- Avoid skin contact.
- Wear suitable protective clothing.
- Work clothing worn by personnel shall be laundered regularly.
- After contact with the product, all parts of the body that have been soiled must be washed.

Respiratory Protection:

- Avoid breathing dust.
- If the ventilation is insufficient, wear appropriate breathing apparatus.
- When workers are confronted with concentrations that are above occupational exposure limits, they must wear a suitable, approved respiratory protection device.
- Wear a mask that is in accordance to category FFP3 standard EN149.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

General information:

Physical State- Solid

Color- Metallic shiny, silver-gray

Important health, safety and environmental information:

pH- not relevant

Boiling Point/Boiling Range- 2730°C (4946°F)

Flash point interval- Not relevant

Vapor Pressure- Not relevant

Density- 8.91 g/cm³ (0.312 lbs/in³)

Water Solubility- Insoluble

Melting Point/Melting Range- 1455°C (2651°F)

Self-ignition temperature- Not relevant

Decomposition point/decomposition range- Not relevant

9.2 Other Information: No data available.



Nickel & Nickel Alloys

Safety Data Sheet
Revision Date: 01/2020

Vista Metals' SDS Nbr: 001
Date of Issue: 01/2020 | Version: 2.0

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Massive metal is stable and not reactive under normal conditions of use, storage and transport.

10.2 Chemical Stability

This element/mixture is stable under the recommended handling and storage conditions in section 7.

10.3 Possibility of Hazardous Reactions

Hazardous polymerization does not occur. Hazardous reactions do not occur.

10.4 Conditions to Avoid

Formation of dusts and humidity.

10.5 Incompatible Materials

Keep away from: Acids, Nitrates, Fluorides, strong oxidizing agents, phosphorous, ammonia, halogens and Sulphur.

10.6 Hazardous Decomposition Products

The thermal decomposition (welding, burning, brazing) may release or form metal oxide fumes.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Inhalation: May cause allergy or asthma symptoms or breathing difficulties if inhaled. Long term inhalation may be harmful and can cause severe damage to organs.

Skin Contact: Repeated or prolonged contact with the mixture may cause removal of natural oil from the skin resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact: Causes serious eye irritation.

Ingestion: If swallowed, do not induce vomiting- seek medical attention immediately and bring label or this safety sheet. If large amounts are ingested, it can cause gastrointestinal irritation

Symptoms related to the physical, chemical and toxicological characteristics: Eye irritation including stinging, tearing, redness, blurred vision and swelling. Difficulty breathing. Dermatitis and rash. If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Acute Toxicity: May cause an allergic skin reaction.

Skin corrosion/irritation: Prolonged contact can cause irritation.

Respiratory Sensitization: May cause breathing difficulty or asthma symptoms.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: Suspected of causing cancer.

Nickel (7440-02-0)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2B- Possibly carcinogenic to humans
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Known to be a Human Carcinogen Reasonably anticipated to be a Human Carcinogen

- Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).

Reproductive Toxicity: Is suspected of damaging an unborn child.

Chronic effects: May cause cancer. Is suspected of damaging an unborn child. Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the



Nickel & Nickel Alloys

Safety Data Sheet
Revision Date: 01/2020

Vista Metals' SDS Nbr: 001
Date of Issue: 01/2020 | Version: 2.0

Page | 7 of 9

carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).

11.2 Information on Toxicological Effects- Ingredient(s)

Nickel (7440-02-0)	
LD50 Oral Rat	>9000 mg/kg

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Do not flush into water or sewer system. Do not empty into drains. This product contains substances which are hazardous to the environment.

Nickel (7440-02-0)	
EC50 Freshwater Algae	0.174 - 0.311 mg/L (exposure 96h) Pseudokirchneriella subcapitata
EC50 Freshwater Algae	=0.18 mg/L (exposure 72h) Pseudokirchneriella subcapitata
LC50 Freshwater Fish	= 10.4mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	= 1.3mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	>100mg/L (exposure 96h) Brachydanio rerio
EC50 Water Flea	=1mg/L (exposure 48h) Daphnia magna
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia magna

12.2 Persistence & Degradability: Insoluble in water.

12.3 Bioaccumulation/Accumulation: Not biodegradable.

12.4 Mobility in soil: Nickel in massive form is not mobile in the environment.

12.5: Results of PBT and vPvB Assessment: This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.

12.6 Other adverse effects: Avoid unnecessary release into the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Scrap related to metal processing are recovered materials.

13.1 Waste Treatment Methods:

- Do not pour into drains or waterways. Dispose of in accordance with local regulations.

Waste:

- Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.
- Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector.
- Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

Soiled Packaging:

- Give to a certified disposal contractor.

SECTION 14: TRANSPORTATION INFORMATION

Exempt from transport classification and labeling.

ADR, RID, AND, IATA, IMDG- This product is not covered by international regulations on the transport of dangerous goods.

SECTION 15: REGULATORY INFORMATION

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

Classification and labeling information included in section 2:

The following regulations have been used:

EU Regulation No. 1272/2008 amended by EU Regulation No. 2018/1480 (ATP 13)

Container information:

None available

Usage restrictions apply to the product: See Annex XVII of EC Regulation No. 1907/2006:

For professional users only



Nickel & Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 001
Revision Date: 01/2020 Date of Issue: 01/2020 | Version: 2.0

Particular provisions:

In accordance with Article 1.3.4 of Annex I of 1272/2008/CE regulations, metals and alloys in massive form do not require a label. Although classified as hazardous according to criteria of the directive, some of these substances are not hazardous for human health by inhalation, ingestion or skin contact, or hazardous to the aquatic environment in the form in which they are placed on the market.

15.2 US Federal Regulations:

Nickel Alloys	
SARA Section 311/312 Hazard Classes	Delayed (chronic) health hazard

Nickel (7440-02-0)	
Listed on the United States TSCA (Toxic Substances Control Act) Inventory- subject to reporting requirements of US SARA Section 313	
CERCLA RQ	100 lb (only applicable if particles are <100µm)
SARA Section 313- Emission Reporting	0.1%

15.3 US State Regulations:

Nickel (7440-02-0)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

SECTION 16: OTHER INFORMATION

Date of Preparation or Latest Revision: 1/2020

Other Information:

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on international, national, and community regulations. The mixture must not be used for other uses than those specified in section 1 without having first obtained written handling instructions. It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations. The information in this safety data sheet must be regarded as a description of the safety requirements relating to the mixture and not as a guarantee of the properties thereof.

Vista Metals, Inc believes that the information in this safety data sheet is accurate. However, Vista Metals, Inc makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.



Nickel & Nickel Alloys

Safety Data Sheet
Revision Date: 01/2020

Vista Metals' SDS Nbr: 001
Date of Issue: 01/2020 | Version: 2.0

H&P Phrases:

H317- May cause an allergic skin reaction.
H351- Suspected of causing cancer.
H372- Causes damage to organs through prolonged or repeated exposure.
P201- Obtain special instructions before use.
P202- Do not handle until all safety precautions have been read and understood.
P260- Do not breathe dust/fume/gas/mist/vapors/spray.
P264- Wash.... Thoroughly after handling.
P270- Do not eat, drink or smoke when using this product.
P272- Contaminated work clothing should not be allowed out of the workplace.
P280- Wear protective gloves/protective clothing/eye protection/face protection
P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
P308 & P313- IF exposed or concerned: Get medical advice/attention.
P314- Get medical advice/attention if you feel unwell.
P333 & P313- If irritation or rash occurs, get medical advice/attention.
P362 & P364- Take off contaminated clothing and wash it before use.
P405- Store locked up.
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

Abbreviations:

ACGIH: American Conference of Governmental Industrial Hygienists
ADR: Alternative Dispute Resolution
AGW: Arbeitsplatzgrenzwerte (occupational exposure limits)
CARC 2: Carcinogenicity category 2
CERCLA RQ: Comprehensive Environmental Response, Compensation, and Liability Act Requirements
DGR: Danger
EC50: Half maximal effective concentration
GHS07: Exclamation mark
GHS08: Health Hazard
IATA: International Air Transport Association
IARC: International Agency for Research on Cancer
IDLH: Immediately dangerous to life or health
IMDG: International Maritime Dangerous Goods
INRS: Institute National de la Recherche Scientifique
LC50: Concentration of material in feed or water that is lethal for 50% of exposed population
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PBT: Persistent, bioaccumulate and toxic
PEL: Permissible Exposure Limit
RID: Regulations concerning the International Carriage of Dangerous goods by Rail
SARA: The superfund Amendments and Reauthorization Act
SKIN SENS. 1: Skin sensitivity category 1
STOT RE 1: Specific Target Organ Toxicity Repeated Exposure
SVHC: Substance of Very High Concern
TLV: Threshold Limit Value
vPvB: Very persistent, very bioaccumulate
WEL: Workplace Exposure Limits

END

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

1.1 Product Identifier (s)

Product Name: Iron-Nickel, Iron-Nickel-Cobalt Alloys
 Chemical Name: Metal Alloy(s)
 Chemical Family: Iron-Nickel-Cobalt Alloys
 Synonyms: Iron-Nickel's; Soft Magnetics
 Trade Names/Alloy Designations: **36, 36FM, 42, 49, 2918 (F15), 500 (K-500), 505; 5000, 5000C, 5048, Fe32Ni**

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

Metal Working- Bar, Rod, Wire & Strip. Raw Material For- Electrical & Mechanical Industry Applications.

Use Descriptor system (REACH):

PC7: Base metals and alloys

1.3 Details of the Supplier of Safety Data Sheet

Company

Vista Metals, Inc
 65 Ballou Blvd
 Bristol, RI 02809
 Phone: 401-253-1772 Fax: 401-253-1806
<https://vismet.com/>

1.4 Emergency Telephone Number

Vista Metals: 401-253-1772 Association/Organization: INRS/ORFILA <http://www.centres-antipoison> Ph: +33 (0)1 45 42 59 59

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification with EC regulation No. 1272/2008 and its amendments

Skin Sensitivity-1 H317
 Carcinogenicity-2 H351
 STOT (repeated exposure)-1 H372
 Acute Toxicity (Oral)- 4 H302

This substance does not present a physical hazard. Consult other references for additional products present on site. No known or foreseeable environmental damage under standard conditions of use.

Full text of hazard classes and H-statements: see Section 16.

2.2 Label Elements

In compliance with EC regulation No. 1272/2008 and its amendments

Hazard Pictograms (GHS)



Signal Word (GHS)

: 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.
 H372- Causes damage to organs through prolonged or repeated exposure.
 H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).

Precautionary Statements (Prevention)

: P201- Obtain special instructions before use.
 P202- Do not handle until all safety precautions have been read and understood.
 P260- Do not breathe dust/fume/gas/mist/vapors/spray.
 P264- Wash.... Thoroughly after handling.
 P270- Do not eat, drink or smoke when using this product.
 P272- Contaminated work clothing should not be allowed out of the workplace.
 P280- Wear protective gloves/protective clothing/eye protection/face protection
 P281- Use personal protective equipment as required.



Iron-Nickel, Iron-Nickel-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 002
Revision Date: 01/10/2020 Date of Issue: 01/10/2020 | Version: 3.0

Precautionary Statements (Response) : P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
P308 & P313- IF exposed or concerned: Get medical advice/attention.
P314- Get medical advice/attention if you feel unwell.
P333 & P313- If irritation or rash occurs, get medical advice/attention.
P362 & P364- Take off contaminated clothing and wash it before use.

Precautionary Statements (Storage) : P405- Store locked up.

Precautionary Statements (Disposal) : P273- Avoid release to the environment
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other Hazards

- **WARNING!** Exposure to dust or fumes can cause eye, skin, respiratory tract infection and flu-like illness. Inhalation or ingestion of dust or fumes can cause respiratory system damage. May cause an allergic skin reaction, and eye and mucous membrane irritation may occur. Contains materials that may cause cancer and/or nervous system effects. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. **Wash hands thoroughly after handling.**
- Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).
- Cobalt and Cobalt Compounds are listed in the Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP). Cobalt compounds **are reasonably anticipated to be a human carcinogen** (2016). Cobalt and Cobalt Compounds are also listed in the Monograph Series of the International Agency for Research on Cancer (IARC). According to IARC, cobalt is classified as Group 2B and therefore **possibly carcinogenic** to humans.
- The mixture does not contain substances classified as "Substances of Very High Concern" (SVHC) $\geq 0.1\%$ published by the European Chemicals Agency (ECHA) under article 57 of REACH: <http://echa.europa.edu/fr/candidate-list-table>
- This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.
- This substance may not require a label according to Article 17 (see section 1.3.3.2 of Annex I).
- Metals in massive form, alloys, mixtures containing polymers, and mixtures containing elastomers, do not require a label according to the provisions of this Annex, if they do not present a hazard to human health by inhalation, ingestion or contact with skin or to the aquatic environment in the form in which they are placed on the market, although classified in accordance with the criteria of this Annex.
- The supplier shall provide the information which shall have appeared on the label to downstream users or distributors in the safety data sheet.
- For alloys with a content of $<1.0\%$ Cobalt eliminates the classification with R42 bzw. H334.
- Hazards not otherwise classified (HNOC) Harmful to aquatic organisms.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Composition of Component

Name	Product Identifier	%	GHS Classification & EC 1272/2008
Nickel	INDEX: 028-002-00-7 CAS: 7440-02-0 EC: 231-111-4	$35 \leq X < 65$	GHS08 • GHS07 • DGR • CARC. 2, H351 STOT RE 1, H372 • SKIN SENS. 1, H317
Iron	INDEX: --- CAS: 7439-89-6 EC: 231-096-4	$48 \leq X < 64$	Comb. Dust
Cobalt	INDEX: 027-001-00-9 CAS: 7440-48-4 EC: 231-158-0	$<0.01 = X < 18$	GHS08 • GHS07 • DGR • CARC. 2B, H351 STOT RE 1, H372 • SKIN SENS. 1, H317 ACUTE TOX. (ORAL) 4, H302



Iron-Nickel, Iron-Nickel-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 002
 Revision Date: 01/10/2020 Date of Issue: 01/10/2020 | Version: 3.0

Full text of H-phrases, see Section 16

3.1.2 Base Metal & Alloying Elements:

Components	CAS Nbr	Exposure Limits			
		ACGIH TLV (mg/m3)		OSHA PEL (mg/m3)	
Iron (Fe)	7439-89-6	5	Oxide Dust / Fume	10	Oxide Dust / Fume
Nickel (Ni)	7440-02-0	1.5	Metal	1	Metal and Insoluble Component
Chromium (Cr)	7440-47-3	0.5	Metals	1	Metal
Aluminum (Al)	7429-90-5	10 5	Dust Fume	15 5	Dust Respirable fraction
Boron (B)	7440-42-8	10	Oxide Dust	15	Oxide Dust
Carbon (C)	7440-44-0	-	Not Established	-	Not Established
Cobalt (Co)	7440-48-4	0.02	As Cobalt (A3 Carcinogen)	0.1	Metal / Dust / Fume
Copper (Cu)	7440-50-8	1 0.2	Dust Fume	1 0.1	Dust Fume
Lead (Pb)	7439-92-1	0.05	Dust/Fume (A3 Carcinogen)	0.05	Dust / Fume
Manganese(Mn)	7439-96-5	0.2	Elemental Mn & Inorganic Compounds	5	Insoluble Compounds
Molybdenum(Mo)	7439-98-7	10	Insoluble Compounds	15	Insoluble Compounds
Niobium (Nb)	7440-03-1	-	Not Established	-	Not Established
Phosphorous(P)	7723-14-0	0.1	Phosphorus	0.1	Phosphorus
Silicon (Si)	7440-21-3	10	Dust	15	Dust
Sulfur (S)	7446-09-05	5.2 13	Sulfur Dioxide Sulfur Dioxide (STEL)	13	Sulfur Dioxide
Titanium (Ti)	7440-32-6	-	Not Established	-	Not Established
Tungsten (W)	7440-33-7	5	Insoluble Compounds as W Insoluble Compounds as W (STEL)	-	Not Established
Vanadium (V)	7440-62-2	0.05	Oxide Dust / Fume	0.5 0.1	Oxide Dust (Ceiling) Oxide Fume (Ceiling)
Zinc (Zn)	7440-66-6	10 5 10	Oxide Dust Oxide Fume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measure:

General: As a general rule, in case of any doubt or if symptoms persist, always call a doctor.

NEVER induce swallowing by an unconscious person.

Inhalation: If inhaled, remove to fresh air and keep at rest in a comfortable breathing position. Get immediate medical attention if breathing difficulty persists or if person has stopped breathing.

Skin Contact: Remove contaminated clothing and wash skin with water and soap or recognized cleaner. Wash contaminated clothing before reuse. Watch out for any remaining product in skin, clothing, shoes, watches, etc. In the event of an allergic reaction, seek medical attention. If the contaminated area is widespread or there is damage to the skin, a doctor must be consulted or the patient transferred to hospital.

Eye Contact: Immediately rinse with water [eyes open] for at least 15 minutes. Remove contact lenses if present and easy to do- continue rinsing. If there is any redness, pain or visual impairment, obtain medical attention.

Ingestion: If swallowed, seek medical attention immediately and bring label or this safety sheet.

4.2 Most important symptoms and effects, both acute and delayed

General: Skin sensitization. May cause cancer. Is suspected of damaging an unborn child. Under normal condition of use, this material is not anticipated to present a significant hazard. If metal dust is produced, it can cause irritation of the skin and respiratory tract and can be harmful.

Inhalation: If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Skin contact: Dust can get stuck in skin folds or by contact with tight clothing.

Eye Contact: Dust that is generated can get stuck in eye, along with slivers as well. Fumes, dust and slivers will most likely cause eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.



Iron-Nickel, Iron-Nickel-Cobalt Alloys

Safety Data Sheet
Revision Date: 01/10/2020

Vista Metals' SDS Nbr: 002
Date of Issue: 01/10/2020 | Version: 3.0

Page | 4 of 13

Chronic Symptoms: May cause cancer. Is suspected of damaging an unborn child. Extended exposure to excessive concentrations of metal fumes and dusts can be associated in permanent changes in the lung function and pulmonary diseases.

- Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).
- Cobalt and Cobalt Compounds are listed in the Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP). Cobalt compounds are **reasonably anticipated to be a human carcinogen** (2016). Cobalt and Cobalt Compounds are also listed in the Monograph Series of the International Agency for Research on Cancer (IARC). According to IARC, cobalt is classified as Group 2B and therefore **possibly carcinogenic** to humans.

4.3 Indication of any immediate medical attention and special treatment needed

In case of injury, make sure the person is up to date with anti-tetanus vaccine. If medical advice is necessary, bring label or safety sheet with you.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media: Non-flammable in massive form. Only dust generated by the processing of metal may be flammable. Do not use water when molten material is involved. The combination of hot product and water will result in an extreme explosion.

5.2 Special hazards arising from the substance or mixture: A fire will often produce a thick, black smoke. Exposure to decomposition byproducts may be hazardous to health. Zinc, copper, magnesium or cadmium fumes may cause metal fumes fever. Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation. **DO NOT use water on molten metal: an explosion hazard could result. DO NOT BREATHE IN SMOKE!**

5.3 Advice for firefighters: Use self-contained breathing apparatus (NIOSH-approved) and full protective clothing must be worn in case of fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, protective equipment & emergency procedures:

- Consult the safety measures listed under sections 7 & 8.
- For non fire-fighters: Avoid any contact with the skin and eyes.
- For fire-fighters: Be equipped with suitable personal protective equipment (see section 8).

6.2 Environmental precautions:

- Prevent any material from entering drains or waterways.

6.3 Methods and material for containment and cleaning up:

- Retrieve the product by mechanical means [sweeping/vacuuming].
- Stop the flow of material if you are without risk.

6.4 Reference to other sections:

- For safety measures and personal protection, see sections 7 & 8.

SECTION 7: HANDLING AND STORAGE

Requirements relating to storage remises apply to all facilities where the mixture is handled.

Individuals with a history of skin sensitization should not, under any circumstances, handle this mixture.

7.1 Precautions for safe handling:

- Always wash hands after handling.
- Remove and wash contaminated clothing before re-using.

Fire Prevention:

- Prevent access by unauthorized personnel.

Recommended equipment and procedures:

- For personal protection, see section 8.

Prohibited equipment and procedures:

- No smoking, eating or drinking in areas where the mixture is used.

7.2 Conditions for safe storage, including any incompatibilities:

- Store in dry and ventilated area.



Iron-Nickel, Iron-Nickel-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 002
 Revision Date: 01/10/2020 Date of Issue: 01/10/2020 | Version: 3.0

- Do not store in a corrosive environment to avoid alloy's oxidation.
- Packaging: Always keep in packaging made of an identical material to the original.

7.3 Specific end use(s): No data available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters:

Occupational exposure limits:

Nickel (7440-02-0)		
USA ACGIH	ACGIH TWA (mg/m ³)	1.5 mg/m ³ – as inhalable fraction
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.015 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	10mg Ni/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³
Iron (7439-89-6)		
USA ACGIH	ACGIH TWA (mg/m ³)	Not Reported
USA OSHA	OSHA PEL (TWA) (mg/m ³)	Not Reported
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	Not Reported
USA IDLH	USA IDLH (mg/m ³)	Not Reported
FRANCE	INRS-ED984 (VME) (mg/m ³)	Not Reported
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	Not Reported
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	Not Reported
Cobalt (7440-48-4)		
USA ACGIH	ACGIH TWA (mg/m ³)	0.02 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	0.1mg/m ³ (dust and fume)
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.05 mg/m ³ (dust and fume)
USA IDLH	USA IDLH (mg/m ³)	20 mg/m ³ (dust and ume)
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³

DNEL (Derived No Effect Level):

Nickel (7440-02-0)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	11.9 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.05mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.05mg Ni/m ³
General Population	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	0.37 mg Ni ion/kgbw/day
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	0.8 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.00006mg Ni/m ³



Iron-Nickel, Iron-Nickel-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 002
 Revision Date: 01/10/2020 Date of Issue: 01/10/2020 | Version: 3.0

		Oral	0.011mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.00006mg Ni/m ³
Iron (7439-89-6)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	3mg/m ³
General Population	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	0.71 mg/kg bw/day
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	0.71 mg/kg bw/day
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified

Cobalt (7440-48-4)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	Medium hazard (no threshold derived)
		Inhalation	High hazard (no threshold derived)
		Ocular	Low hazard (no threshold derived)
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Local Effects	Dermal	Medium hazard (no threshold derived)
Inhalation		40 µg/m ³	
General Population	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	No hazard identified
	Acute- Local Effects	Dermal	Medium hazard (no threshold derived)
		Inhalation	High hazard (no threshold derived)
		Oral	29.8 µg/kg bw/day
	Long-term- Systemic Effects	Dermal	Medium hazard (no threshold derived)
		Inhalation	No hazard identified
		Oral	29.8 µg/kg bw/day
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	6.3 µg/m ³

PNEC (Predicted No Effect Concentration):

Nickel (7440-02-0)	
Freshwater	7.1 µg/L
Marine Water	8.6 µg/L
Sewage Treatment	0.33 µg/L
Terrestrial Organisms	29.9 mg/kg soil dw



Iron-Nickel, Iron-Nickel-Cobalt Alloys

Safety Data Sheet
Revision Date: 01/10/2020

Vista Metals' SDS Nbr: 002
Date of Issue: 01/10/2020 | Version: 3.0

Predators (secondary poisoning)	0.12 mg/kg food
---------------------------------	-----------------

Iron (7439-89-6)	
Freshwater	No data; unlikely aquatic toxicity
Marine Water	No data; unlikely aquatic toxicity
Sewage Treatment	NO data; unlikely aquatic toxicity
Terrestrial Organisms	The mixture is not classified as toxic or harmful
Predators (secondary poisoning)	Insufficient hazard data available (further info necessary)

Cobalt (7440-48-4)	
Freshwater	0.62 µg/L
Marine Water	2.36 µg/L
Sewage Treatment	0.37 mg/L
Terrestrial Organisms	10.9 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation

8.2 Exposure Controls

Personal Protection measures, such as personal protective equipment:

- Use personal protective equipment that is clean and has been properly maintained.
- Store personal protective equipment in a clean place, away from the work area.
- Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using.
- Ensure that there is adequate ventilation, especially in confined areas.

Eye/Face Protection:

- Avoid contact with eyes.
- Wearing glasses is recommended- especially before handling powders or dust emission in accordance with standard ANSI A87, EN 166

Hand Protection:

- Wear suitable protective gloves in the event of prolonged or repeated skin contact.
- Gloves must be selected according to the application and during use at the workstation.
- Use gloves that are resistant to chemical agents in accordance to standard EN ISO 374.
- Protective gloves need to be selected according to their suitability for the workstation in question: other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required. Cut-resistant gloves should be in accordance with standard EN 388 & EN 420

Body Protection:

- Avoid skin contact.
- Wear suitable protective clothing.
- Work clothing worn by personnel shall be laundered regularly.
- After contact with the product, all parts of the body that have been soiled must be washed.

Respiratory Protection:

- Avoid breathing dust.
- If the ventilation is insufficient, wear appropriate breathing apparatus.
- When workers are confronted with concentrations that are above occupational exposure limits, they must wear a suitable, approved respiratory protection device.
- Wear a mask that is in accordance to category FFP3 standard EN149.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

General information:

Physical State- Solid

Color- Metallic, dull to shiny gray

Important health, safety and environmental information:

pH- not relevant



Iron-Nickel, Iron-Nickel-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 002
Revision Date: 01/10/2020 Date of Issue: 01/10/2020 | Version: 3.0

- Boiling Point/Boiling Range-** 2730°C (4946°F)
- Flash point interval-** Not relevant
- Vapor Pressure-** Not relevant
- Density-** 8.0 g/cm³ (0.300 lbs/in³)
- Water Solubility-** Insoluble
- Melting Point/Melting Range-** 1450°C (2642°F)
- Self-ignition temperature-** Not relevant
- Decomposition point/decomposition range-** Not relevant
- 9.2 Other Information:** No data available.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Massive metal is stable and not reactive under normal conditions of use, storage and transport.

10.2 Chemical Stability

This element/mixture is stable under the recommended handling and storage conditions in section 7.

10.3 Possibility of Hazardous Reactions

Hydrogen is released in contact with acid which can cause explosive gas mixtures.

10.4 Conditions to Avoid

Formation of dusts and humidity.

10.5 Incompatible Materials

Keep away from: Acids, Nitrates, Fluorides, strong oxidizing agents, phosphorous, ammonia, halogens and Sulphur.

10.6 Hazardous Decomposition Products

The thermal decomposition (welding, burning, brazing) may release or form metal oxide fumes.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Inhalation: May cause allergy or asthma symptoms or breathing difficulties. Inhalation or ingestion of dust or fumes can cause respiratory system damage.

Skin Contact: Repeated or prolonged contact with the mixture may cause removal of natural oil from the skin resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact: Causes serious eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Symptoms related to the physical, chemical and toxicological characteristics: Eye irritation including stinging, tearing, redness, blurred vision and swelling. Difficulty breathing. Dermatitis and rash. If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Acute Toxicity: May cause an allergic skin reaction.

Skin corrosion/irritation: Prolonged contact can cause irritation.

Respiratory Sensitization: May cause breathing difficulty or asthma symptoms.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: Suspected of causing cancer.

Nickel (7440-02-0)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2- Suspected human carcinogen
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list
US National Toxicology Program (NTP) Report on Carcinogens	Known to be a Human Carcinogen Reasonably anticipated to be a Human Carcinogen

Iron (7439-89-6)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed



Iron-Nickel, Iron-Nickel-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 002
 Revision Date: 01/10/2020 Date of Issue: 01/10/2020 | Version: 3.0

OSHA Specifically Regulated Substances	Not Listed
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Cobalt (7440-48-4)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2B- Possibly carcinogenic to humans
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list
US National Toxicology Program (NTP) Report on Carcinogens	Reasonably anticipated to be a Human Carcinogen

Reproductive Toxicity: Repeated and prolonged exposure to fumes and dust created in processing this product may cause reproductive effects.
Chronic effects: May cause cancer. Is suspected of damaging an unborn child. Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation.

11.2 Information on Toxicological Effects- Ingredient(s)

Nickel (7440-02-0)	
LD50 Oral	>9000 mg/kg/bw
LC50 Inhalation	>10.2mg/L

Iron (7439-89-6)	
LD50 Oral	98,600 mg/kg bw
LC50 Inhalation	>0.25mg/L

Cobalt (7440-48-4)	
LD50 Oral	550mg/kg bw
LD50 Dermal	>2000 mg/kg bw
LC50 Inhalation	<0.05 mg/L

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Do not flush into water or sewer system. Do not empty into drains. This product contains substances which are hazardous to the environment.

Nickel (7440-02-0)	
EC50 Freshwater Algae	0.174 - 0.311 mg/L (exposure 96h) Pseudokirchneriella subcapitata
EC50 Freshwater Algae	=0.18 mg/L (exposure 72h) Pseudokirchneriella subcapitata
LC50 Freshwater Fish	= 10.4mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	= 1.3mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	>100mg/L (exposure 96h) Brachydanio rerio
EC50 Water Flea	=1mg/L (exposure 48h) Daphnia magna
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia magna

Iron (7439-89-6)	
EC50 Microorganisms	>10,000 mg/L (exposure 3h) Activated sludge
LC50 Freshwater Fish	>10,000 mg/L (exposure 96h) Danio rerio
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia Magna

Cobalt (7440-48-4)	
EC50 Algae	144ug Co/L (exposure 72h) Pseudokirchneriella supcapita
LC50 Freshwater Fish	1.5mg Co/L (exposure 96h) Oncorhynchus mykiss
LC50 Freshwater Fish	85mg Co/L (exposure 96h) Danio rerio
EC50 Microorganisms	120mg Co/L (exposure 3h) Activated sludge



Iron-Nickel, Iron-Nickel-Cobalt Alloys

Safety Data Sheet
Revision Date: 01/10/2020

Vista Metals' SDS Nbr: 002
Date of Issue: 01/10/2020 | Version: 3.0

LC50 Crustacea	0.61mg Co/L (exposure 48h) Ceriodaphnia dubia
----------------	---

12.2 Persistence & Degradability: Insoluble in water.

12.3 Bioaccumulation/Accumulation: Not biodegradable.

12.4 Mobility in soil: Nickel in massive form is not mobile in the environment.

12.5: Results of PBT and vPvB Assessment: This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.

12.6 Other adverse effects: Avoid unnecessary release into the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Scrap related to metal processing are recovered materials.

13.1 Waste Treatment Methods:

- Do not pour into drains or waterways. Dispose of in accordance with local regulations.

Waste:

- Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.
- Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector.
- Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

Soiled Packaging:

- Give to a certified disposal contractor.

SECTION 14: TRANSPORTATION INFORMATION

Exempt from transport classification and labeling.

ADR, RID, AND, IATA, IMDG- This product is not covered by international regulations on the transport of dangerous goods.

SECTION 15: REGULATORY INFORMATION

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

Classification and labeling information included in section 2:

The following regulations have been used:

EU Regulation No. 1272/2008 amended by EU Regulation No. 2018/1480 (ATP 13)

Regulation (EC) No 1907/2006 Annex XVII Conditions of restriction: 27

Container information:

None available

Usage restrictions apply to the product: See Annex XVII of EC Regulation No. 1907/2006:

For professional users only

Particular provisions:

In accordance with Article 1.3.4 of Annex I of 1272/2008/CE regulations, metals and alloys in massive form do not require a label. Although classified as hazardous according to criteria of the directive, some of these substances are not hazardous for human health by inhalation, ingestion or skin contact, or hazardous to the aquatic environment in the form in which they are placed on the market.

15.2 US Federal Regulations:

Nickel- Iron Alloy	
SARA Section 311/312 Hazard Classes	Acute & Delayed Health Hazard

Nickel (7440-02-0)	
Listed on the United States TSCA (Toxic Substances Control Act) Inventory- subject to reporting requirements of US SARA Section 313	
CERCLA RQ	100 lb (only applicable if particles are <100µm)
SARA Section 313- Emission Reporting	0.1%



Iron-Nickel, Iron-Nickel-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 002
Revision Date: 01/10/2020 Date of Issue: 01/10/2020 | Version: 3.0

Iron (7439-89-6)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	Not Listed

Cobalt (7440-48-4)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	0.1%

15.3 US State Regulations:

Nickel (7440-02-0)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

Iron (7439-89-6)	
Not Listed	

Cobalt (7440-48-4)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

SECTION 16: OTHER INFORMATION

Date of Preparation or Latest Revision: 01/2020

Other Information:

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on international, national, and community regulations. The mixture must not be used for other uses than those specified in section 1 without having first obtained written handling instructions. It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations. The information in this safety data sheet must be regarded as a description of the safety requirements relating to the mixture and not as a guarantee of the properties thereof.

Vista Metals, Inc believes that the information in this safety data sheet is accurate. However, Vista Metals, Inc makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.



Iron-Nickel, Iron-Nickel-Cobalt Alloys

Safety Data Sheet
Revision Date: 01/10/2020

Vista Metals' SDS Nbr: 002
Date of Issue: 01/10/2020 | Version: 3.0

H&P Phrases:

H317- May cause an allergic skin reaction.
H334- May cause allergy or asthma symptoms or breathing difficulties if inhaled
H351- Suspected of causing cancer.
H372- Causes damage to organs through prolonged or repeated exposure.
H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).
P201- Obtain special instructions before use.
P202- Do not handle until all safety precautions have been read and understood.
P260- Do not breathe dust/fume/gas/mist/vapors/spray.
P264- Wash.... Thoroughly after handling.
P270- Do not eat, drink or smoke when using this product.
P272- Contaminated work clothing should not be allowed out of the workplace.
P280- Wear protective gloves/protective clothing/eye protection/face protection
P281- Use personal protective equipment as required.
P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
P308 & P313- IF exposed or concerned: Get medical advice/attention.
P314- Get medical advice/attention if you feel unwell.
P333 & P313- If irritation or rash occurs, get medical advice/attention.
P362 & P364- Take off contaminated clothing and wash it before use.
P405- Store locked up.
P273- Avoid release to the environment
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

Abbreviations:

ACGIH: American Conference of Governmental Industrial Hygienists
ADR: Alternative Dispute Resolution
AGW: Arbeitsplatzgrenzwerte (occupational exposure limits)
CARC 2B: Carcinogenicity category 2B
CARC 2: Carcinogenicity category 2
CERCLA RQ: Comprehensive Environmental Response, Compensation, and Liability Act Requirements
DGR: Danger
EC50: Half maximal effective concentration
GHS07: Exclamation mark
GHS08: Health Hazard
IATA: International Air Transport Association
IARC: International Agency for Research on Cancer
IDLH: Immediately dangerous to life or health
IMDG: International Maritime Dangerous Goods
INRS: Institute National de la Recherche Scientifique
LC50: Concentration of material in feed or water that is lethal for 50% of exposed population
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program



Iron-Nickel, Iron-Nickel-Cobalt Alloys

Safety Data Sheet
Revision Date: 01/10/2020

Vista Metals' SDS Nbr: 002
Date of Issue: 01/10/2020 | Version: 3.0

OSHA: Occupational Safety and Health Administration
PBT: Persistent, bioaccumulate and toxic
PEL: Permissible Exposure Limit
RID: Regulations concerning the International Carriage of Dangerous goods by Rail
SARA: The superfund Amendments and Reauthorization Act
SKIN SENS. 1: Skin sensitivity category 1
STOT RE 1: Specific Target Organ Toxicity Repeated Exposure
SVHC: Substance of Very High Concern
TLV: Threshold Limit Value
vPvB: Very persistent, very bioaccumulate
WEL: Workplace Exposure Limits

END

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

1.1 Product Identifier (s)

Product Name: Nickel-Iron-Chrome, Iron-Nickel-Chrome, Stainless Steels, Filler Metals and Iron Alloys

Chemical Name: Metal Alloy(s)

Chemical Family: Nickel-Chrome-Irons; Nickel-Iron-Chrome, Iron

Synonyms: Nickel-Iron-Chrome Alloys, Stainless Steels, NiChrome, NiChrome-A

Trade Names/Alloy Designations:

Nickel-Iron-Chrome : 60NiCr, 6015 (Amorphous Co-Fe), 7030 (Ni-Cr), 718, 8020, 8020Cb, 8020M, X750

Iron-Chrome-Nickel : 17-7, 20, 350

Filler Metals : 362FM, 392FM, 82FM, 82eFM, 92FM

Nickel-Chrome-Cobalt : 2170, 2205, 35N, 9010, C22, C276, VF9CR

Stainless Steels & Inconel : 301, 304, 304L, 305, 316L, 600, 600HC, 600LC, 600LFE, 601, 625, 625LFE, 625LI, 800H, 825

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

Metal Working- Bar, Rod, Wire & Strip. Raw material for: electrical & mechanical industry applications.

Use Descriptor system (REACH):

PC7: Base metals and alloys

1.3 Details of the Supplier of Safety Data Sheet

Company

Vista Metals, Inc

65 Ballou Blvd

Bristol, RI 02809

Phone: 401-253-1772 Fax: 401-253-1806

<https://vismet.com/>

1.4 Emergency Telephone Number

Vista Metals: 401-253-1772

Association/Organization: INRS/ORFILA <http://www.centres-antipoison>

Ph: +33 (0)1 45 42 59 59

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification with EC regulation No. 1272/2008 and its amendments

Skin Sensitivity-1 H317

Carcinogenicity-2 H351

STOT (repeated exposure)-1 H372

Acute Toxicity (Oral)- 4 H302

This substance does not present a physical hazard. Consult other references for additional products present on site. No known or foreseeable environmental damage under standard conditions of use.

Full text of hazard classes and H-statements: see Section 16.

2.2 Label Elements

In compliance with EC regulation No. 1272/2008 and its amendments

Hazard Pictograms (GHS) :



Signal Word (GHS) : 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.
H372- Causes damage to organs through prolonged or repeated exposure.
H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).

Precautionary Statements (Prevention) : P201- Obtain special instructions before use.
P202- Do not handle until all safety precautions have been read and understood.
P260- Do not breathe dust/fume/gas/mist/vapors/spray.
P264- Wash.... Thoroughly after handling.
P270- Do not eat, drink or smoke when using this product.



Nickel-Chromium, Stainless Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 003
Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 2.0

P272- Contaminated work clothing should not be allowed out of the workplace.
P280- Wear protective gloves/protective clothing/eye protection/face protection
P281- Use personal protective equipment as required.

Precautionary Statements (Response) : P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
P308 & P313- IF exposed or concerned: Get medical advice/attention.
P314- Get medical advice/attention if you feel unwell.
P333 & P313- If irritation or rash occurs, get medical advice/attention.
P362 & P364- Take off contaminated clothing and wash it before use.

Precautionary Statements (Storage) : P405- Store locked up.

Precautionary Statements (Disposal) : P273- Avoid release to the environment
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other Hazards

- **WARNING!** Exposure to dust or fumes can cause eye, skin, respiratory tract infection and flu-like illness. Inhalation or ingestion of dust or fumes can cause respiratory system damage. May cause an allergic skin reaction, and eye and mucous membrane irritation may occur. Contains materials that may cause cancer and/or nervous system effects. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. **Wash hands thoroughly after handling.**
- Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).
- Cobalt and Cobalt Compounds are listed in the Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP). Cobalt compounds are **reasonably anticipated to be a known carcinogen** (2016). Cobalt and Cobalt Compounds are also listed in the Monograph Series of the International Agency for Research on Cancer (IARC). According to IARC, cobalt is classified as Group 2B and therefore **possibly carcinogenic** to humans.
- Exposure to inhalation to high levels of manganese can result in an illness called manganism- resulting in lethargy and weakness, and can progress to other symptoms such as dizziness, and speech and psychological disturbances.
- The mixture does not contain substances classified as "Substances of Very High Concern" (SVHC) ≥ 0.1% published by the European Chemicals Agency (ECHA) under article 57 of REACH: <http://echa.europa.edu/fr/candidate-list-table>
- This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.
- This substance may not require a label according to Article 17 (see section 1.3.3.2 of Annex I).
- Metals in massive form, alloys, mixtures containing polymers, and mixtures containing elastomers, do not require a label according to the provisions of this Annex, if they do not present a hazard to human health by inhalation, ingestion or contact with skin or to the aquatic environment in the form in which they are placed on the market, although classified in accordance with the criteria of this Annex.
- The supplier shall provide the information which shall have appeared on the label to downstream users or distributors in the safety data sheet.
- For alloys with a content of <1.0% Cobalt eliminates the classification with R42 bzw. H334.
- Hazards not otherwise classified (HNOC) Harmful to aquatic organisms.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Composition of Component

Name	Product Identifier	%	GHS Classification & EC 1272/2008
Nickel	INDEX: 028-002-00-7 CAS: 7440-02-0 EC: 231-111-4	4.5 ≤ X < 87	GHS08 • GHS07 • DGR • CARC. 2, H351 STOT RE 1, H372 • SKIN SENS. 1, H317 ACUTE TOX. (ORAL) 2, H300



Nickel-Chromium, Stainless Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 003
 Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 2.0

Chromium Non-Hexavalent	INDEX: --- CAS: 7440-47-3 EC: 231-157-5	$10 \leq X < 30$	GHS08 • GHS07 • DGR • CARC. 3, H351 STOT RE 1, H372 • SKIN SENS. 1, H317 ACUTE TOX. (ORAL) 4, H302
Cobalt	INDEX: 027-001-00-9 CAS: 7440-48-4 EC: 231-158-0	$< 0.1 \leq X < 10$	GHS08 • GHS07 • DGR • CARC. 2B, H351 STOT RE 1, H372 • SKIN SENS. 1, H317 ACUTE TOX. (ORAL) 4, H302
Iron	INDEX: --- CAS: 7439-89-6 EC: 231-096-4	$< 0.5 = X < 80$	Comb. Dust
Molybdenum	INDEX: --- CAS: 7439-98-7 EC: 231-107-2	$< 0.01 = X < 13$	Comb. Dust
Manganese	INDEX: 7439-96-5 CAS: 7439-96-5 EC: 231-105-1	$< 0.01 = X < 4$	Comb. Dust
Silicon	INDEX: --- CAS: 7440-21-3 EC: 231-130-8	< 1.5	Comb. Dust

Full text of H-phrases, see Section 16

3.1.2 Base Metal & Alloying Elements:

Components	CAS Nbr	Exposure Limits			
		ACGIH TLV (mg/m3)		OSHA PEL (mg/m3)	
Iron (Fe)	7439-89-6	5	Oxide Dust / Fume	10	Oxide Dust / Fume
Nickel (Ni)	7440-02-0	1.5	Metal	1	Metal and Insoluble Component
Chromium (Cr)	7440-47-3	0.5	Metals	1	Metal
Aluminum (Al)	7429-90-5	10 5	Dust Fume	15 5	Dust Respirable fraction
Boron (B)	7440-42-8	10	Oxide Dust	15	Oxide Dust
Carbon (C)	7440-44-0	-	Not Established	-	Not Established
Cobalt (Co)	7440-48-4	0.02	As Cobalt (A3 Carcinogen)	0.1	Metal / Dust / Fume
Copper (Cu)	7440-50-8	1 0.2	Dust Fume	1 0.1	Dust Fume
Lead (Pb)	7439-92-1	0.05	Dust/Fume (A3 Carcinogen)	0.05	Dust / Fume
Manganese(Mn)	7439-96-5	0.2	Elemental Mn & Inorganic Compounds	5	Insoluble Compounds
Molybdenum(Mo)	7439-98-7	10	Insoluble Compounds	15	Insoluble Compounds
Niobium (Nb)	7440-03-1	-	Not Established	-	Not Established
Phosphorous(P)	7723-14-0	0.1	Phosphorus	0.1	Phosphorus
Silicon (Si)	7440-21-3	10	Dust	15	Dust
Sulfur (S)	7446-09-05	5.2 13	Sulfur Dioxide Sulfur Dioxide (STEL)	13	Sulfur Dioxide
Titanium (Ti)	7440-32-6	-	Not Established	-	Not Established
Tungsten (W)	7440-33-7	5	Insoluble Compounds as W Insoluble Compounds as W (STEL)	-	Not Established
Vanadium (V)	7440-62-2	0.05	Oxide Dust / Fume	0.5 0.1	Oxide Dust (Ceiling) Oxide Fume (Ceiling)
Zinc (Zn)	7440-66-6	10 5 10	Oxide Dust Oxide Fume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measure:

General: As a general rule, in case of any doubt or if symptoms persist, always call a doctor.

NEVER induce swallowing by an unconscious person.



Nickel-Chromium, Stainless Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 003
Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 2.0

Inhalation: If inhaled, remove to fresh air and keep at rest in a comfortable breathing position. Get immediate medical attention if breathing difficulty persists or if person has stopped breathing.

Skin Contact: Remove contaminated clothing and wash skin with water and soap or recognized cleaner. Wash contaminated clothing before reuse. Watch out for any remaining product in skin, clothing, shoes, watches, etc. In the event of an allergic reaction, seek medical attention. If the contaminated area is widespread or there is damage to the skin, a doctor must be consulted or the patient transferred to hospital.

Eye Contact: Immediately rinse with water [eyes open] for at least 15 minutes. Remove contact lenses if present and easy to do- continue rinsing. If there is any redness, pain or visual impairment, obtain medical attention.

Ingestion: If swallowed, seek medical attention immediately and bring label or this safety sheet.

4.2 Most important symptoms and effects, both acute and delayed

General: Skin sensitization. May cause cancer. Is suspected of damaging an unborn child. Under normal condition of use, this material is not anticipated to present a significant hazard. If metal dust is produced, it can cause irritation of the skin and respiratory tract and can be harmful.

- **Inhalation:** If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection. Exposure to inhalation to high levels of manganese can result in an illness called manganism- resulting in lethargy and weakness, and can progress to other symptoms such as dizziness, and speech and psychological disturbances. Silicon dusts are a low risk by inhalation and should be treated as a nuisance dust.

Skin contact: Dust can get stuck in skin folds or by contact with tight clothing.

Eye Contact: Dust that is generated can get stuck in eye, along with slivers as well. Fumes, dust and slivers will most likely cause eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Chronic Symptoms: May cause cancer. Is suspected of damaging an unborn child. Extended exposure to excessive concentrations of metal fumes and dusts can be associated in permanent changes in the lung function and pulmonary diseases.

- Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).
- Cobalt and Cobalt Compounds are listed in the Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP). Cobalt compounds are **reasonably anticipated to be a human carcinogen** (2016). Cobalt and Cobalt Compounds are also listed in the Monograph Series of the International Agency for Research on Cancer (IARC). According to IARC, cobalt is classified as Group 2B and therefore **possibly carcinogenic** to humans.
- Exposure to inhalation to high levels of manganese can result in an illness called manganism- resulting in lethargy and weakness, and can progress to other symptoms such as dizziness, and speech and psychological disturbances

4.3 Indication of any immediate medical attention and special treatment needed

In case of injury, make sure the person is up to date with anti-tetanus vaccine. If medical advice is necessary, bring label or safety sheet with you.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media: Non-flammable in massive form. Only dust generated by the processing of metal may be flammable. Do not use water when molten material is involved. The combination of hot product and water will result in an extreme explosion.

5.2 Special hazards arising from the substance or mixture: A fire will often produce a thick, black smoke. Exposure to decomposition byproducts may be hazardous to health. **DO NOT use water on molten metal: an explosion hazard could result. DO NOT BREATHE IN SMOKE!**

5.3 Advice for firefighters: Use self-contained breathing apparatus (NIOSH-approved) and full protective clothing must be worn in case of fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, protective equipment & emergency procedures:

- Consult the safety measures listed under sections 7 & 8.
- For non fire-fighters: Avoid any contact with the skin and eyes.
- For fire-fighters: Be equipped with suitable personal protective equipment (see section 8).

6.2 Environmental precautions:

- Prevent any material from entering drains or waterways.

6.3 Methods and material for containment and cleaning up:



Nickel-Chromium, Stainless Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 003
Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 2.0

- Retrieve the product by mechanical means [sweeping/vacuuming].
- Stop the flow of material if you are without risk.

6.4 Reference to other sections:

- For safety measures and personal protection, see sections 7 & 8.

SECTION 7: HANDLING AND STORAGE

Requirements relating to storage renises apply to all facilities where the mixture is handled.

Individuals with a history of skin sensitization should not, under any circumstances, handle this mixture.

7.1 Precautions for safe handling:

- Always wash hands after handling.
- Remove and wash contaminated clothing before re-using.

Fire Prevention:

- Prevent access by unauthorized personnel.

Recommended equipment and procedures:

- For personal protection, see section 8.

Prohibited equipment and procedures:

- No smoking, eating or drinking in areas where the mixture is used.

7.2 Conditions for safe storage, including any incompatibilities:

- Store in dry and ventilated area.
- Do not store in a corrosive environment to avoid alloy's oxidation.
- Packaging: Always keep in packaging made of an identical material to the original.

7.3 Specific end use(s): No data available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters:

Occupational exposure limits:

Nickel (7440-02-0)		
USA ACGIH	ACGIH TWA (mg/m ³)	1.5 mg/m ³ – as inhalable fraction
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.015 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	10mg Ni/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³
Chromium (7440-47-3)		
USA ACGIH	ACGIH TWA (mg/m ³)	0.5mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.5mg/m ³
USA IDLH	USA IDLH (mg/m ³)	Not Reported [Effective IDLH=500mg/m ³]
FRANCE	INRS-ED984 (VME) (mg/m ³)	2mg/m ³
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	2mg/m ³
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.5mg/m ³
Cobalt (7440-48-4)		
USA ACGIH	ACGIH TWA (mg/m ³)	0.02 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	0.1mg/m ³ (dust and fume)
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.05 mg/m ³ (dust and fume)
USA IDLH	USA IDLH (mg/m ³)	20 mg/m ³ (dust and ume)
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³



Nickel-Chromium, Stainless Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 003
 Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 2.0

Iron (7439-89-6)		
USA ACGIH	ACGIH TWA (mg/m ³)	Not Reported
USA OSHA	OSHA PEL (TWA) (mg/m ³)	Not Reported
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	Not Reported
USA IDLH	USA IDLH (mg/m ³)	Not Reported
FRANCE	INRS-ED984 (VME) (mg/m ³)	Not Reported
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	Not Reported
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	Not Reported
Molybdenum (7439-98-7)		
USA ACGIH	ACGIH TWA (mg/m ³)	10mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	15mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	No Established RELs
USA IDLH	USA IDLH (mg/m ³)	5,000mg Mo/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	5mg/m ³
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	Not Reported
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	5mg/ m ³
Manganese (7439-96-5)		
USA ACGIH	ACGIH TWA (mg/m ³)	1 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	C 5mg/ m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	1mg/m ³
USA IDLH	USA IDLH (mg/m ³)	No evidence [*Effective IDLH=10,000mg Mn/ m ³]
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,02 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.5 mg/m ³
Silicon (7440-21-3)		
USA ACGIH	ACGIH TWA (mg/m ³)	10 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	15 mg/m ³ (total dust PNOR)
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	10mg/m ³ (total dust)
USA IDLH	USA IDLH (mg/m ³)	NE
FRANCE	INRS-ED984 (VME) (mg/m ³)	10mg/m ³
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	---
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	10mg/m ³

DNEL (Derived No Effect Level):

Nickel (7440-02-0)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	11.9 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.05mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.05mg Ni/m ³
General Population	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	0.37 mg Ni ion/kgbw/day
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	0.8 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.00006mg Ni/m ³
		Oral	0.011mg Ni/m ³



Nickel-Chromium, Stainless Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 003
 Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 2.0

	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.00006mg Ni/m ³
Chromium (7440-47-3)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	0.5mg/m ³
General Population	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	No hazard identified
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	0.027 mg/m ³
Cobalt (7440-48-4)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	Medium hazard (no threshold derived)
		Inhalation	High hazard (no threshold derived)
	Long-term- Systemic Effects	Ocular	Low hazard (no threshold derived)
		Dermal	No hazard identified
	Long-term- Local Effects	Inhalation	No hazard identified
		Dermal	Medium hazard (no threshold derived)
General Population	Acute- Systemic Effects	Inhalation	40 µg/m ³
		Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Oral	No hazard identified
		Dermal	Medium hazard (no threshold derived)
	Long-term- Systemic Effects	Inhalation	High hazard (no threshold derived)
		Dermal	Medium hazard (no threshold derived)
		Inhalation	No hazard identified
	Long-term- Local Effects	Oral	29.8 µg/kg bw/day
Dermal		No hazard identified	
Iron (7439-89-6)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	3mg/m ³
General Population	Acute- Systemic Effects	Dermal	No hazard identified



Nickel-Chromium, Stainless Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 003
Date of Issue: 07/20/2020 | Version: 2.0

		Inhalation	No hazard identified	
		Oral	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Oral	0.71 mg/kg bw/day	
	Long-term- Local Effects	Dermal	No hazard identified	
Inhalation		No hazard identified		
Molybdenum (7439-98-7)				
Workers	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Ocular	No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	11.7 mg/ m ³	
	Long-term- Local Effects	Dermal	No hazard identified	
Inhalation		No hazard identified		
General Population	Acute- Systemic Effects	Dermal	No threshold effect	
		Inhalation	No hazard identified	
		Oral	Exposure based waiving	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	3.33mg/ m ³	
		Oral	3.4 mg/kg bw/day	
	Long-term- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Manganese (7439-96-5)			
	Workers	Acute- Systemic Effects	Dermal	No hazard identified
Inhalation			No hazard identified	
Acute- Local Effects		Dermal	No hazard identified	
		Inhalation	0.2mg/m3	
Long-term- Systemic Effects		Ocular	No hazard identified	
		Dermal	0.004 mg/kg bw/day	
Long-term- Local Effects		Inhalation	0.2mg/m3	
		Dermal	No hazard identified	
General Population	Acute- Systemic Effects	Inhalation	0.2mg/m3	
		Dermal	No threshold effect	
		Inhalation	No hazard identified	
	Acute- Local Effects	Oral	Exposure based waiving	
		Dermal	No hazard identified	
	Long-term- Systemic Effects	Inhalation	Exposure based waiving	
		Dermal	0.002 mg/kg bw/day	
		Inhalation	0.041mg/m3	
	Long-term- Local Effects	Oral	No threshold effect	
		Dermal	No hazard identified	
Inhalation		0.041mg/m3		



Nickel-Chromium, Stainless Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 003
Date of Issue: 07/20/2020 | Version: 2.0

Silicon (7440-21-3)				
Workers	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Systemic Effects	Ocular	No hazard identified	
		Dermal	No hazard identified	
	Long-term- Local Effects	Inhalation	No hazard identified	
		Dermal	No hazard identified	
	General Population	Acute- Systemic Effects	Inhalation	No hazard identified
			Dermal	No hazard identified
Inhalation			No hazard identified	
Acute- Local Effects		Oral	No hazard identified	
		Dermal	No hazard identified	
Long-term- Systemic Effects		Inhalation	No hazard identified	
		Dermal	No hazard identified	
		Inhalation	No hazard identified	
Long-term- Local Effects		Oral	No hazard identified	
		Dermal	No hazard identified	
		Inhalation	No hazard identified	

PNEC (Predicted No Effect Concentration):

Nickel (7440-02-0)	
Freshwater	7.1 µg/L
Marine Water	8.6 µg/L
Sewage Treatment	0.33 µg/L
Terrestrial Organisms	29.9 mg/kg soil dw
Predators (secondary poisoning)	0.12 mg/kg food
Chromium (7440-47-3)	
Freshwater	6.5 µg/L
Marine Water	No data; unlikely aquatic toxicity
Sewage Treatment	No data; unlikely aquatic toxicity
Terrestrial Organisms	21.1 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation
Cobalt (7440-48-4)	
Freshwater	0.62 µg/L
Marine Water	2.36 µg/L
Sewage Treatment	0.37 mg/L
Terrestrial Organisms	10.9 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation
Iron (7439-89-6)	
Freshwater	No data; unlikely aquatic toxicity
Marine Water	No data; unlikely aquatic toxicity
Sewage Treatment	No data; unlikely aquatic toxicity
Terrestrial Organisms	The mixture is not classified as toxic or harmful
Predators (secondary poisoning)	Insufficient hazard data available (further info necessary)
Molybdenum (7439-98-7)	
Freshwater	12.7 mg/L
Marine Water	2.28 mg/L
Sewage Treatment	21.7 mg/L
Terrestrial Organisms	9.9 mg/kg soil dw



Nickel-Chromium, Stainless Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 003
Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 2.0

Predators (secondary poisoning)	Not Listed
Manganese (7439-96-5)	
Freshwater	0.034 mg/L
Marine Water	0.003 mg/L
Sewage Treatment	100 mg/L
Terrestrial Organisms	3.4 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation
Silicon (7440-21-3)	
Freshwater	Not Listed
Marine Water	Not Listed
Sewage Treatment	Not Listed
Terrestrial Organisms	Not Listed
Predators (secondary poisoning)	No potential for bioaccumulation

8.2 Exposure Controls

Personal Protection measures, such as personal protective equipment:

- Use personal protective equipment that is clean and has been properly maintained.
- Store personal protective equipment in a clean place, away from the work area.
- Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using.
- Ensure that there is adequate ventilation, especially in confined areas.

Eye/Face Protection:

- Avoid contact with eyes.
- Wearing glasses is recommended- especially before handling powders or dust emission in accordance with standard ANSI A87, EN 166

Hand Protection:

- Wear suitable protective gloves in the event of prolonged or repeated skin contact.
- Gloves must be selected according to the application and during use at the workstation.
- Use gloves that are resistant to chemical agents in accordance to standard EN ISO 374.
- Protective gloves need to be selected according to their suitability for the workstation in question: other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required. Cut-resistant gloves should be in accordance with standard EN 388 & EN 420

Body Protection:

- Avoid skin contact.
- Wear suitable protective clothing.
- Work clothing worn by personnel shall be laundered regularly.
- After contact with the product, all parts of the body that have been soiled must be washed.

Respiratory Protection:

- Avoid breathing dust.
- If the ventilation is insufficient, wear appropriate breathing apparatus.
- When workers are confronted with concentrations that are above occupational exposure limits, they must wear a suitable, approved respiratory protection device.
- Wear a mask that is in accordance to category FFP3 standard EN149.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

General information:

Physical State- Solid

Color- Metallic, dull to shiny

Important health, safety and environmental information:

pH- not relevant

Boiling Point/Boiling Range- Approximately 2730°C (4946°F)

Flash point interval- Not relevant

Vapor Pressure- Not relevant



Nickel-Chromium, Stainless Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 003
Date of Issue: 07/20/2020 | Version: 2.0

Density- 8.0 g/cm³ (0.300 lbs/in³)

Water Solubility- Insoluble

Melting Point/Melting Range- 1450°C (2642°F)

Self-ignition temperature- Not relevant

Decomposition point/decomposition range- Not relevant

9.2 Other Information: No data available.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Massive metal is stable and not reactive under normal conditions of use, storage and transport.

10.2 Chemical Stability

This element/mixture is stable under the recommended handling and storage conditions in section 7.

10.3 Possibility of Hazardous Reactions

Hydrogen is released in contact with acid which can cause explosive gas mixtures.

10.4 Conditions to Avoid

Formation of dusts and humidity.

10.5 Incompatible Materials

Keep away from: Acids, Nitrates, Fluorides, strong oxidizing agents, phosphorous, ammonia, halogens and Sulphur.

10.6 Hazardous Decomposition Products

The thermal decomposition (welding, burning, brazing) may release or form metal oxide fumes.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Inhalation: May cause allergy or asthma symptoms or breathing difficulties. Inhalation or ingestion of dust or fumes can cause respiratory system damage.

Skin Contact: Repeated or prolonged contact with the mixture may cause removal of natural oil from the skin resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact: Causes serious eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Symptoms related to the physical, chemical and toxicological characteristics: Eye irritation including stinging, tearing, redness, blurred vision and swelling. Difficulty breathing. Dermatitis and rash. If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Acute Toxicity: May cause an allergic skin reaction.

Skin corrosion/irritation: Prolonged contact can cause irritation.

Respiratory Sensitization: May cause breathing difficulty or asthma symptoms.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: Suspected of causing cancer (inhalation).

Nickel (7440-02-0)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2- Suspected human carcinogen
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list
US National Toxicology Program (NTP) Report on Carcinogens	Known to be a Human Carcinogen Reasonably anticipated to be a Human Carcinogen

Chromium (7440-47-3)	
IARC Monographs, Overall Evaluation of Carcinogenicity	3- Not classifiable as to its carcinogenicity to humans
OSHA Specifically Regulated Substances	Not Listed
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed



Nickel-Chromium, Stainless Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 003
Date of Issue: 07/20/2020 | Version: 2.0

Cobalt (7440-48-4)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2B- Possibly carcinogenic to humans
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list
US National Toxicology Program (NTP) Report on Carcinogens	Reasonably anticipated to be a Human Carcinogen

Iron (7439-89-6)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Listed
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Molybdenum (7439-98-7)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Manganese (7439-96-5)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Silicon (7440-21-3)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Listed
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Evaluated

Reproductive Toxicity: Repeated and prolonged exposure to fumes and dust created in processing this product may cause reproductive effects.
Chronic effects: May cause cancer. Is suspected of damaging an unborn child. Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Exposure to inhalation to high levels of manganese can result in an illness called manganism- resulting in lethargy and weakness, and can progress to other symptoms such as dizziness, and speech and psychological disturbances.

11.2 Information on Toxicological Effects- Ingredient(s)

Nickel (7440-02-0)	
LD50 Oral	>9000 mg/kg/bw
LC50 Inhalation	>10.2mg/L

Chromium (7440-47-3)	
LD50 Oral	>3400 mg/kg bw
LC50 Inhalation	>5.41mg/L

Cobalt (7440-48-4)	
LD50 Oral	550mg/kg bw
LD50 Dermal	>2000 mg/kg bw
LC50 Inhalation	<0.05 mg/L



Nickel-Chromium, Stainless Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 003
Date of Issue: 07/20/2020 | Version: 2.0

Iron (7439-89-6)	
LD50 Oral	98,600 mg/kg bw
LC50 Inhalation	>0.25mg/L

Molybdenum (7439-98-7)	
LD50 Oral	>6,000 mg/kg bw
LC50 Inhalation	>2.82 mg/L/ 4 hr

Manganese (7439-96-5)	
LD50 Oral	>2000 mg/kg bw
LC50 Inhalation	Not listed

Silicon (7440-21-3)	
LD50 Oral	3,160 mg/kg bw
LC50 Inhalation	No data available

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Do not flush into water or sewer system. Do not empty into drains. This product contains substances which are hazardous to the environment.

Nickel (7440-02-0)	
EC50 Freshwater Algae	0.174 - 0.311 mg/L (exposure 96h) Pseudokirchneriella subcapitata
EC50 Freshwater Algae	=0.18 mg/L (exposure 72h) Pseudokirchneriella subcapitata
LC50 Freshwater Fish	= 10.4mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	= 1.3mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	>100mg/L (exposure 96h) Brachydanio rerio
EC50 Water Flea	=1mg/L (exposure 48h) Daphnia magna
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia magna

Chromium (7440-47-3)	
EC50 Crustacea	0.024mg/L (exposure 48h) Daphnia
EC50 Water Flea	0.025mg/L (exposure 48h) Daphnia magna
EC50 Freshwater Fish	0.002-0.003mg/L (exposure 96h) Oncorhynchus mykiss

Cobalt (7440-48-4)	
EC50 Algae	144ug Co/L (exposure 72h) Pseudokirchneriella supcapita
LC50 Freshwater Fish	1.5mg Co/L (exposure 96h) Oncorhynchus mykiss
LC50 Freshwater Fish	85mg Co/L (exposure 96h) Danio rerio
EC50 Microorganisms	120mg Co/L (exposure 3h) Activated sludge
LC50 Crustacea	0.61mg Co/L (exposure 48h) Ceriodaphnia dubia

Iron (7439-89-6)	
EC50 Microorganisms	>10,000 mg/L (exposure 3h) Activated sludge
LC50 Freshwater Fish	>10,000 mg/L (exposure 96h) Danio rerio
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia Magna

Molybdenum (7439-98-7)	
EC50 Algae	362.9 mg/L (exposure 72h) Pseudokirchnerella subcapitata
LC50 Freshwater Fish	644.2 mg/L (exposure 96h) Pimephales promelas
EC50 Microorganisms	820 mg/L (exposure 3h) Activated sludge
LC50 Water Flea	>1,727.8 mg/L (exposure 48h) Daphnia magna
LC50 Crustacea	1,015 mg/L (exposure 48h) Ceriodaphnia dubia



Nickel-Chromium, Stainless Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 003
Date of Issue: 07/20/2020 | Version: 2.0

Page | 14 of 17

Manganese (7439-96-5)	
EC50 Microorganisms	Not Listed
LC50 Freshwater Fish	>3.6 mg/L (exposure 96h) <i>Oncorhynchus mykiss</i>
EC50 Water Flea	Not Listed

Silicon (7440-21-3)	
No data listed	

12.2 Persistence & Degradability: Insoluble in water.

12.3 Bioaccumulation/Accumulation: Not biodegradable.

12.4 Mobility in soil: Nickel in massive form is not mobile in the environment.

12.5: Results of PBT and vPvB Assessment: This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.

12.6 Other adverse effects: Avoid unnecessary release into the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Scrap related to metal processing are recovered materials.

13.1 Waste Treatment Methods:

- Do not pour into drains or waterways. Dispose of in accordance with local regulations.

Waste:

- Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.
- Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector.
- Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

Soiled Packaging:

- Give to a certified disposal contractor.

SECTION 14: TRANSPORTATION INFORMATION

Exempt from transport classification and labeling.

ADR, RID, AND, IATA, IMDG- This product is not covered by international regulations on the transport of dangerous goods.

SECTION 15: REGULATORY INFORMATION

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

Classification and labeling information included in section 2:

The following regulations have been used:

EU Regulation No. 1272/2008 amended by EU Regulation No. 2018/1480

Regulation (EC) No 1907/2006 Annex XVII

Container information:

None available

Usage restrictions apply to the product: See Annex XVII of EC Regulation No. 1907/2006:

For professional users only

Particular provisions:

In accordance with Article 1.3.4 of Annex I of 1272/2008/CE regulations, metals and alloys in massive form do not require a label. Although classified as hazardous according to criteria of the directive, some of these substances are not hazardous for human health by inhalation, ingestion or skin contact, or hazardous to the aquatic environment in the form in which they are placed on the market.

15.2 US Federal Regulations:

Nickel- Iron Alloy	
SARA Section 311/312 Hazard Classes	Acute & Delayed Health Hazard



Nickel-Chromium, Stainless Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 003
 Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 2.0

Nickel (7440-02-0)	
Listed on the United States TSCA (Toxic Substances Control Act) Inventory- subject to reporting requirements of US SARA Section 313	
CERCLA RQ	100 lb (only applicable if particles are <100µm)
SARA Section 313- Emission Reporting	0.1%

Chromium (7440-47-3)	
CERCLA RQ	5,000 lbs RQ [solid metal particles <100µm diameter (0.004")]
SARA Section 313- Emission Reporting	Yes

Cobalt (7440-48-4)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	0.1%

Iron (7439-89-6)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	Not Listed

Molybdenum (7439-98-7)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	Not Listed

Manganese (7439-96-5)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	1.0%

Silicon (7440-21-3)	
CERCLA RQ	Not Listed
SARA Section 311/312 Hazards	Fire Hazard
SARA Section 313- Emission Reporting	Not Listed

15.3 US State Regulations:

Nickel (7440-02-0)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

Chromium (7440-47-3)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer (Chromium Hexavalent)
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	



Nickel-Chromium, Stainless Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 003
Date of Issue: 07/20/2020 | Version: 2.0

Cobalt (7440-48-4)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

Iron (7439-89-6)	
Not Listed	

Manganese (7439-96-5)
US- Massachusetts-Right to Know Hazardous Substances List
US- Pennsylvania-Right to Know Environmental Hazard List
US- Pennsylvania- Right to Know Special Hazardous Substances
US- Pennsylvania- Right to Know List
US- Rhode Island- Right to Know Hazardous Substances List

Molybdenum (7439-98-7)
US- Massachusetts-Right to Know List
UA-New Jersey- Right to Know List
US- Pennsylvania-Right to Know Environmental Hazard List
US- Pennsylvania- Right to Know Special Hazardous Substances

Silicon (7440-21-3)
US- Massachusetts- Right to Know List
US- New Jersey- Right to Know Hazardous Substance List
US- Pennsylvania-Right to Know Environmental Hazard List
US- Pennsylvania- Right to Know Special Hazardous Substances
US- Pennsylvania- Right to Know List
US- Rhode Island- Right to Know Hazardous Substances List

SECTION 16: OTHER INFORMATION

Date of Preparation or Latest Revision: 7/20/2020

Other Information:

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on international, national, and community regulations. The mixture must not be used for other uses than those specified in section 1 without having first obtained written handling instructions. It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations. The information in this safety data sheet must be regarded as a description of the safety requirements relating to the mixture and not as a guarantee of the properties thereof.

Vista Metals, Inc believes that the information in this safety data sheet is accurate. However, Vista Metals, Inc makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.



Nickel-Chromium, Stainless Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 003
Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 2.0

Page | 17 of 17

H&P Phrases:

H317- May cause an allergic skin reaction.
H334- May cause allergy or asthma symptoms or breathing difficulties if inhaled
H351- Suspected of causing cancer.
H372- Causes damage to organs through prolonged or repeated exposure.
H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).
P201- Obtain special instructions before use.
P202- Do not handle until all safety precautions have been read and understood.
P260- Do not breathe dust/fume/gas/mist/vapors/spray.
P264- Wash.... Thoroughly after handling.
P270- Do not eat, drink or smoke when using this product.
P272- Contaminated work clothing should not be allowed out of the workplace.
P280- Wear protective gloves/protective clothing/eye protection/face protection
P281- Use personal protective equipment as required.
P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
P308 & P313- IF exposed or concerned: Get medical advice/attention.
P314- Get medical advice/attention if you feel unwell.
P333 & P313- If irritation or rash occurs, get medical advice/attention.
P362 & P364- Take off contaminated clothing and wash it before use.
P405- Store locked up.
P273- Avoid release to the environment
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

Abbreviations:

ACGIH: American Conference of Governmental Industrial Hygienists
ADR: Alternative Dispute Resolution
AGW: Arbeitsplatzgrenzwerte (occupational exposure limits)
CARC 2: Carcinogenicity category 2
CARC 2B: Carcinogenicity category 2B
CARC 3: Carcinogenicity category 3
CERCLA RQ: Comprehensive Environmental Response, Compensation, and Liability Act Requirements
DGR: Danger
EC50: Half maximal effective concentration
GHS07: Exclamation mark
GHS08: Health Hazard
IATA: International Air Transport Association
IARC: International Agency for Research on Cancer
IDLH: Immediately dangerous to life or health
IMDG: International Maritime Dangerous Goods
INRS: Institute National de la Recherche Scientifique
LC50: Concentration of material in feed or water that is lethal for 50% of exposed population
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PBT: Persistent, bioaccumulate and toxic
PEL: Permissible Exposure Limit
RID: Regulations concerning the International Carriage of Dangerous goods by Rail
SARA: The superfund Amendments and Reauthorization Act
SKIN SENS. 1: Skin sensitivity category 1
STOT RE 1: Specific Target Organ Toxicity Repeated Exposure
SVHC: Substance of Very High Concern
TLV: Threshold Limit Value
vPvB: Very persistent, very bioaccumulate
WEL: Workplace Exposure Limits

END

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

1.1 Product Identifier (s)

Product Name: Copper-Manganese-Nickel
 Chemical Name: Metal Alloy(s)
 Chemical Family: Copper-Manganese-Nickel
 Synonyms: Manganese Resistance or Shunt Alloys
 Trade Names/Alloy Designations: **37, 38, 42Mn, 43Mn, 48**

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

Metal Working- Bar, Rod, Wire, Strip & Cut Lengths

Use Descriptor system (REACH):

PC7: Base metals and alloys

1.3 Details of the Supplier of Safety Data Sheet

Company

Vista Metals, Inc
 65 Ballou Blvd
 Bristol, RI 02809
 Phone: 401-253-1772 Fax: 401-253-1806
<https://vismet.com/>

1.4 Emergency Telephone Number

Vista Metals: 401-253-1772 Association/Organization: INRS/ORFILA <http://www.centres-antipoison> Ph: +33 (0)1 45 42 59 59

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification with EC regulation No. 1272/2008 and its amendments

Skin Sensitivity-1 H317
 Carcinogenicity-2 H351
 STOT (repeated exposure)-2 H372

This substance does not present a physical hazard. Consult other references for additional products present on site. No known or foreseeable environmental damage under standard conditions of use.

Full text of hazard classes and H-statements: see Section 16.

2.2 Label Elements

In compliance with EC regulation No. 1272/2008 and its amendments

Hazard Pictograms (GHS)



Signal Word (GHS) : WARNING

Hazard Statements : H317- May cause an allergic skin reaction.
 H351- Suspected of causing cancer.
 H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).

Precautionary Statements (Prevention) : P201- Obtain special instructions before use.
 P202- Do not handle until all safety precautions have been read and understood.
 P260- Do not breathe dust/fume/gas/mist/vapors/spray.
 P261- Avoid breathing dust/fume/gas/mist/vapors/spray
 P264- Wash.... Thoroughly after handling.
 P272- Contaminated work clothing should not be allowed out of the workplace.
 P280- Wear protective gloves/protective clothing/eye protection/face protection
 P281- Use personal protective equipment as required.

Precautionary Statements (Response) : P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
 P308 & P313- IF exposed or concerned: Get medical advice/attention.
 P314- Get medical advice/attention if you feel unwell.
 P321- Specific treatment (see... on this label)
 P333 & P313- If irritation or rash occurs, get medical advice/attention.



Copper-Manganese-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 004
Revision Date: 05/07/2020 Date of Issue: 05/07/2020 | Version: 1.0

P362 & P364- Take off contaminated clothing and wash it before use.

Precautionary Statements (Storage) : P405- Store locked up.

Precautionary Statements (Disposal) : P273- Avoid release to the environment
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other Hazards

- **WARNING!** Exposure to dust or fumes can cause eye, skin, respiratory tract infection and flu-like illness. Inhalation or ingestion of dust or fumes can cause respiratory system damage. May cause an allergic skin reaction, and eye and mucous membrane irritation may occur. Contains materials that may cause cancer and/or nervous system effects. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. **Wash hands thoroughly after handling.**
- Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).
- The mixture does not contain substances classified as "Substances of Very High Concern" (SVHC) $\geq 0.1\%$ published by the European Chemicals Agency (ECHA) under article 57 of REACH: <http://echa.europa.edu/fr/candidate-list-table>
- This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.
- This substance may not require a label according to Article 17 (see section 1.3.3.2 of Annex I).
- Metals in massive form, alloys, mixtures containing polymers, and mixtures containing elastomers, do not require a label according to the provisions of this Annex, if they do not present a hazard to human health by inhalation, ingestion or contact with skin or to the aquatic environment in the form in which they are placed on the market, although classified in accordance with the criteria of this Annex.
- The supplier shall provide the information which shall have appeared on the label to downstream users or distributors in the safety data sheet.
- Hazards not otherwise classified (HNOC) Harmful to aquatic organisms.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Composition of Component

Name	Product Identifier	%	GHS Classification & EC 1272/2008
Copper	INDEX: 7440-50-8 CAS: 7440-50-8 EC: 231-159-6 REACH: 1-2119480154-42	$50 \leq X < 100$	Comb. Dust
Manganese	INDEX: 7439-96-5 CAS: 7439-96-5 EC: 231-105-1	$10 \leq X < 25$	Comb. Dust
Nickel	INDEX: 028-002-00-7 CAS: 7440-02-0 EC: 231-111-4	$2.5 \leq X < 10$	GHS08 • GHS07 • DGR • CARC. 2, H351 STOT RE 1, H372 • SKIN SENS. 1, H317

Full text of H-phrases, see Section 16



Copper-Manganese-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 004
 Revision Date: 05/07/2020 Date of Issue: 05/07/2020 | Version: 1.0

3.1.2 Base Metal & Alloying Elements:

Components	CAS Nbr	Exposure Limits			
		ACGIH TLV (mg/m3)	OSHA PEL (mg/m3)		
Iron (Fe)	7439-89-6	5	Oxide Dust / Fume	10	Oxide Dust / Fume
Nickel (Ni)	7440-02-0	1.5	Metal	1	Metal and Insoluble Component
Chromium (Cr)	7440-47-3	0.5	Metals	1	Metal
Aluminum (Al)	7429-90-5	10 5	Dust Fume	15 5	Dust Respirable fraction
Boron (B)	7440-42-8	10	Oxide Dust	15	Oxide Dust
Carbon (C)	7440-44-0	-	Not Established	-	Not Established
Cobalt (Co)	7440-48-4	0.02	As Cobalt (A3 Carcinogen)	0.1	Metal / Dust / Fume
Copper (Cu)	7440-50-8	1 0.2	Dust Fume	1 0.1	Dust Fume
Lead (Pb)	7439-92-1	0.05	Dust/Fume (A3 Carcinogen)	0.05	Dust / Fume
Manganese(Mn)	7439-96-5	0.2	Elemental Mn & Inorganic Compounds	5	Insoluble Compounds
Molybdenum(Mo)	7439-98-7	10	Insoluble Compounds	15	Insoluble Compounds
Niobium (Nb)	7440-03-1	-	Not Established	-	Not Established
Phosphorous(P)	7723-14-0	0.1	Phosphorus	0.1	Phosphorus
Silicon (Si)	7440-21-3	10	Dust	15	Dust
Sulfur (S)	7446-09-05	5.2 13	Sulfur Dioxide Sulfur Dioxide (STEL)	13	Sulfur Dioxide
Titanium (Ti)	7440-32-6	-	Not Established	-	Not Established
Tungsten (W)	7440-33-7	5	Insoluble Compounds as W Insoluble Compounds as W (STEL)	-	Not Established
Vanadium (V)	7440-62-2	0.05	Oxide Dust / Fume	0.5 0.1	Oxide Dust (Ceiling) Oxide Fume (Ceiling)
Zinc (Zn)	7440-66-6	10 5 10	Oxide Dust Oxide Fume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measure:

General: As a general rule, in case of any doubt or if symptoms persist, always call a doctor.

NEVER induce swallowing by an unconscious person.

Inhalation: If inhaled, remove to fresh air and keep at rest in a comfortable breathing position. Get immediate medical attention if breathing difficulty persists or if person has stopped breathing.

Skin Contact: Remove contaminated clothing and wash skin with water and soap or recognized cleaner. Wash contaminated clothing before reuse. Watch out for any remaining product in skin, clothing, shoes, watches, etc. In the event of an allergic reaction, seek medical attention. If the contaminated area is widespread or there is damage to the skin, a doctor must be consulted or the patient transferred to hospital.

Eye Contact: Immediately rinse with water [eyes open] for at least 15 minutes. Remove contact lenses if present and easy to do- continue rinsing. If there is any redness, pain or visual impairment, obtain medical attention.

Ingestion: If swallowed, seek medical attention immediately and bring label or this safety sheet.

4.2 Most important symptoms and effects, both acute and delayed

General: Skin sensitization. May cause cancer. Is suspected of damaging an unborn child. Under normal condition of use, this material is not anticipated to present a significant hazard. If metal dust is produced, it can cause irritation of the skin and respiratory tract and can be harmful.

Inhalation: If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Skin contact: Dust can get stuck in skin folds or by contact with tight clothing.

Eye Contact: Dust that is generated can get stuck in eye, along with slivers as well. Fumes, dust and slivers will most likely cause eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Chronic Symptoms: Nickel compounds and Metallic nickel may cause cancer. Is suspected of damaging an unborn child. Extended exposure to excessive concentrations of metal fumes and dusts can be associated in permanent changes in the lung function and pulmonary diseases.

- Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds



Copper-Manganese-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 004
Revision Date: 05/07/2020 Date of Issue: 05/07/2020 | Version: 1.0

Page | 4 of 12

are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).

4.3 Indication of any immediate medical attention and special treatment needed

In case of injury, make sure the person is up to date with anti-tetanus vaccine. If medical advice is necessary, bring label or safety sheet with you.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media: Non-flammable in massive form. Only dust generated by the processing of metal may be flammable. Do not use water when molten material is involved. The combination of hot product and water will result in an extreme explosion.

5.2 Special hazards arising from the substance or mixture: A fire will often produce a thick, black smoke. Exposure to decomposition byproducts may be hazardous to health. Do not breathe in smoke. Fumes may cause metal fumes fever. **DO NOT use water on molten metal: an explosion hazard could result. DO NOT BREATHE IN SMOKE!**

5.3 Advice for firefighters: Use self-contained breathing apparatus (NIOSH-approved) and full protective clothing must be worn in case of fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, protective equipment & emergency procedures:

- Consult the safety measures listed under sections 7 & 8.
- For non fire-fighters: Avoid any contact with the skin and eyes.
- For fire-fighters: Be equipped with suitable personal protective equipment (see section 8).

6.2 Environmental precautions:

- Prevent any material from entering drains or waterways.

6.3 Methods and material for containment and cleaning up:

- Retrieve the product by mechanical means [sweeping/vacuuming].
- Stop the flow of material if you are without risk.

6.4 Reference to other sections:

- For safety measures and personal protection, see sections 7 & 8.

SECTION 7: HANDLING AND STORAGE

Requirements relating to storage remises apply to all facilities where the mixture is handled.

Individuals with a history of skin sensitization should not, under any circumstances, handle this mixture.

7.1 Precautions for safe handling:

- Always wash hands after handling.
- Remove and wash contaminated clothing before re-using.

Fire Prevention:

- Prevent access by unauthorized personnel.

Recommended equipment and procedures:

- For personal protection, see section 8.

Prohibited equipment and procedures:

- No smoking, eating or drinking in areas where the mixture is used.

7.2 Conditions for safe storage, including any incompatibilities:

- Store in dry and ventilated area.
- Do not store in a corrosive environment to avoid alloy's oxidation.
- Packaging: Always keep in packaging made of an identical material to the original.

7.3 Specific end use(s):

No data available



Copper-Manganese-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 004
 Revision Date: 05/07/2020 Date of Issue: 05/07/2020 | Version: 1.0

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters:

Occupational exposure limits:

Manganese (7439-96-5)		
USA ACGIH	ACGIH TWA (mg/m ³)	1 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	C 5mg/ m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	1mg/m ³
USA IDLH	USA IDLH (mg/m ³)	No evidence [*Effective IDLH=10,000mg Mn/ m ³]
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,02 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.5 mg/m ³
Copper (7440-50-8)		
USA ACGIH	ACGIH TWA (mg/m ³)	1 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1 mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	1 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	No evidence [**Effective** IDLH=2,000mg Cu/m ³]
FRANCE	INRS-ED984 (VME) (mg/m ³)	Not Reported
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0.11 mg/m ³ [ceiling 0.21mg/ m ³]
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.2 mg/ m ³
Nickel (7440-02-0)		
USA ACGIH	ACGIH TWA (mg/m ³)	1.5 mg/m ³ – as inhalable fraction
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.015 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	10mg Ni/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³

DNEL (Derived No Effect Level):

Manganese (7439-96-5)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	0.2mg/m ³
		Ocular	No hazard identified
	Long-term- Systemic Effects	Dermal	0.004 mg/kg bw/day
		Inhalation	0.2mg/m ³
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	0.2mg/m ³
	General Population	Acute- Systemic Effects	Dermal
Inhalation			No hazard identified
Oral			Exposure based waiving
Acute- Local Effects		Dermal	No hazard identified
		Inhalation	Exposure based waiving
Long-term- Systemic Effects		Dermal	0.002 mg/kg bw/day
		Inhalation	0.041mg/m ³
		Oral	No threshold effect
Long-term- Local Effects		Dermal	No hazard identified
		Inhalation	0.041mg/m ³



Copper-Manganese-Nickel Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 004
Date of Issue: 05/07/2020 | Version: 1.0

Copper (7440-50-8)			
Workers	Acute- Systemic Effects	Dermal	273 mg/kg/bw/day
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	1mg/m3
		Ocular	No hazard identified
	Long-term- Systemic Effects	Dermal	137 mg/kg/bw/day
		Inhalation	No hazard identified
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	1 mg/m3
	General Population	Acute- Systemic Effects	Dermal
Inhalation			No hazard identified
Oral			Low hazard [no threshold derived]
Acute- Local Effects		Dermal	No hazard identified
		Inhalation	1mg/m3
Long-term- Systemic Effects		Dermal	137 mg/kg/bw/day
		Inhalation	No hazard identified
		Oral	0.041 mg/kg/bw/day
Long-term- Local Effects		Dermal	No hazard identified
		Inhalation	1mg/m3

Nickel (7440-02-0)				
Workers	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	11.9 mg Ni/m ³	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	0.05mg Ni/m ³	
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²	
		Inhalation	0.05mg Ni/m ³	
	General Population	Acute- Systemic Effects	Dermal	No hazard identified
			Inhalation	No hazard identified
Oral			0.37 mg Ni ion/kgbw/day	
Acute- Local Effects		Dermal	No hazard identified	
		Inhalation	0.8 mg Ni/m ³	
Long-term- Systemic Effects		Dermal	No hazard identified	
		Inhalation	0.00006mg Ni/m ³	
		Oral	0.011mg Ni/m ³	
Long-term- Local Effects		Dermal	0.035mg Ni/cm ²	
		Inhalation	0.00006mg Ni/m ³	

PNEC (Predicted No Effect Concentration):

Manganese (7439-96-5)	
Freshwater	0.034 mg/L
Marine Water	0.003 mg/L
Sewage Treatment	100 mg/L
Terrestrial Organisms	3.4 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation



Copper-Manganese-Nickel Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 004
Date of Issue: 05/07/2020 | Version: 1.0

Copper (7440-50-8)	
Freshwater	7.8 µg/L
Marine Water	5.2 µg/L
Sewage Treatment	230 mg/L
Terrestrial Organisms	65 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation

Nickel (7440-02-0)	
Freshwater	7.1 µg/L
Marine Water	8.6 µg/L
Sewage Treatment	0.33 µg/L
Terrestrial Organisms	29.9 mg/kg soil dw
Predators (secondary poisoning)	0.12 mg/kg food

8.2 Exposure Controls

Personal Protection measures, such as personal protective equipment:

- Use personal protective equipment that is clean and has been properly maintained.
- Store personal protective equipment in a clean place, away from the work area.
- Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using.
- Ensure that there is adequate ventilation, especially in confined areas.

Eye/Face Protection:

- Avoid contact with eyes.
- Wearing glasses is recommended- especially before handling powders or dust emission in accordance with standard ANSI A87, EN 166

Hand Protection:

- Wear suitable protective gloves in the event of prolonged or repeated skin contact.
- Gloves must be selected according to the application and during use at the workstation.
- Use gloves that are resistant to chemical agents in accordance to standard EN ISO 374.
- Protective gloves need to be selected according to their suitability for the workstation in question: other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required. Cut-resistant gloves should be in accordance with standard EN 388 & EN 420

Body Protection:

- Avoid skin contact.
- Wear suitable protective clothing.
- Work clothing worn by personnel shall be laundered regularly.
- After contact with the product, all parts of the body that have been soiled must be washed.

Respiratory Protection:

- Avoid breathing dust.
- If the ventilation is insufficient, wear appropriate breathing apparatus.
- When workers are confronted with concentrations that are above occupational exposure limits, they must wear a suitable, approved respiratory protection device.
- Wear a mask that is in accordance to category FFP3 standard EN149.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

General information:

Physical State- Solid

Color- Light metallic orange to orange-brown

Important health, safety and environmental information:

pH- not relevant

Boiling Point/Boiling Range- Not specified

Flash point interval- Not relevant



Copper-Manganese-Nickel Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 004
Date of Issue: 05/07/2020 | Version: 1.0

Vapor Pressure- Not relevant

Density- 8.8 g/cm³ (0.3071 lbs/in³)

Water Solubility- Insoluble

Melting Point/Melting Range- 1050°C (1922°F)

Self-ignition temperature- Not specified

Decomposition point/decomposition range- Not specified

9.2 Other Information: No data available.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Massive metal is stable and not reactive under normal conditions of use, storage and transport.

10.2 Chemical Stability

This element/mixture is stable under the recommended handling and storage conditions in section 7.

10.3 Possibility of Hazardous Reactions

No data available

10.4 Conditions to Avoid

Formation of dusts and humidity.

10.5 Incompatible Materials

Keep away from: Acids & Strong Oxidizing Agents

10.6 Hazardous Decomposition Products

The thermal decomposition (welding, burning, brazing) may release or form metal oxide fumes.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Inhalation: May cause allergy or asthma symptoms or breathing difficulties. Inhalation or ingestion of dust or fumes can cause respiratory system damage in the event of repeated or prolonged exposure. Suspected human carcinogen.

Skin Contact: Repeated or prolonged contact with the mixture may cause removal of natural oil from the skin resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact: Causes serious eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Symptoms related to the physical, chemical and toxicological characteristics: Eye irritation including stinging, tearing, redness, blurred vision and swelling. Difficulty breathing. Dermatitis and rash. If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection. Exposure to inhalation to high levels of manganese can result in an illness called manganism- resulting in lethargy and weakness, and can progress to other symptoms such as dizziness, and speech and psychological disturbances.

Acute Toxicity: May cause an allergic skin reaction.

Skin corrosion/irritation: Prolonged contact can cause irritation.

Respiratory Sensitization: May cause breathing difficulty or asthma symptoms.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: Suspected of causing cancer.

Manganese (7439-96-5)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Copper (7440-50-8)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed



Copper-Manganese-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 004
Revision Date: 05/07/2020 Date of Issue: 05/07/2020 | Version: 1.0

US National Toxicology Program (NTP) Report on Carcinogens	Not Listed
--	------------

Nickel (7440-02-0)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2- Suspected human carcinogen
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Known to be a Human Carcinogen Reasonably anticipated to be a Human Carcinogen

Reproductive Toxicity: Repeated and prolonged exposure to fumes and dust created in processing this product may cause reproductive effects.
Chronic effects: May cause cancer. Is suspected of damaging an unborn child. Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Exposure to inhalation to high levels of manganese can result in an illness called manganism- resulting in lethargy and weakness, and can progress to other symptoms such as dizziness, and speech and psychological disturbances.

11.2 Information on Toxicological Effects- Ingredient(s)

Manganese (7439-96-5)	
LD50 Oral	>2000 mg/kg bw
LC50 Inhalation	Not listed

Copper (7440-50-8)	
LD50 Oral	472 mg/kg bw
LC50 Inhalation	0.73 mg/L

Nickel (7440-02-0)	
LD50 Oral	>9000 mg/kg/bw
LC50 Inhalation	>10.2mg/L

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Do not flush into water or sewer system. Do not empty into drains. This product contains substances which are hazardous to the environment.

Manganese (7439-96-5)	
EC50 Microorganisms	Not Listed
LC50 Freshwater Fish	>3.6 mg/L (exposure 96h) Oncorhynchus mykiss
EC50 Water Flea	Not Listed

Copper (7440-50-8)	
EC50 Algae	0.0426-0.0535 mg/L (exposure 72h)
LC50 Freshwater Fish	0.15 mg/L (exposure 96h) Oncorhynchus mykiss
LC50 Freshwater Fish	0.8 mg/L (exposure 96h) Cuprinus carpio
EC50 Microorganisms	Not Listed
EC50 Water Flea	0.03 mg/L (exposure 48h) Daphnia magna

Nickel (7440-02-0)	
EC50 Freshwater Algae	0.174 - 0.311 mg/L (exposure 96h) Pseudokirchneriella subcapitata
EC50 Freshwater Algae	=0.18 mg/L (exposure 72h) Pseudokirchneriella subcapitata
LC50 Freshwater Fish	= 10.4mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	= 1.3mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	>100mg/L (exposure 96h) Brachydanio rerio
EC50 Water Flea	=1mg/L (exposure 48h) Daphnia magna
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia magna



Copper-Manganese-Nickel Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 004
Date of Issue: 05/07/2020 | Version: 1.0

12.2 Persistence & Degradability: Insoluble in water.

12.3 Bioaccumulation/Accumulation: Not biodegradable.

12.4 Mobility in soil: Nickel in massive form is not mobile in the environment.

12.5: Results of PBT and vPvB Assessment: This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.

12.6 Other adverse effects: Avoid unnecessary release into the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Scrap related to metal processing are recovered materials.

13.1 Waste Treatment Methods:

- Do not pour into drains or waterways. Dispose of in accordance with local regulations.

Waste:

- Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.
- Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector.
- Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

Soiled Packaging:

- Give to a certified disposal contractor.

SECTION 14: TRANSPORTATION INFORMATION

Exempt from transport classification and labeling.

ADR, RID, AND, IATA, IMDG- This product is not covered by international regulations on the transport of dangerous goods.

SECTION 15: REGULATORY INFORMATION

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

Classification and labeling information included in section 2:

The following regulations have been used:

EU Regulation No. 1272/2008 amended by EU Regulation No. 2018/1480 (ATP 13)

Regulation (EC) No 1907/2006 Annex XVII Conditions of restriction: 27

Container information:

None available

Usage restrictions apply to the product: See Annex XVII of EC Regulation No. 1907/2006:

For professional users only

Particular provisions:

In accordance with Article 1.3.4 of Annex I of 1272/2008/CE regulations, metals and alloys in massive form do not require a label. Although classified as hazardous according to criteria of the directive, some of these substances are not hazardous for human health by inhalation, ingestion or skin contact, or hazardous to the aquatic environment in the form in which they are placed on the market.

15.2 US Federal Regulations:

Manganese (7439-96-5)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	1.0%

Copper (7440-50-8)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	0.1%

Nickel- Iron Alloy	
SARA Section 311/312 Hazard Classes	Acute & Delayed Health Hazard



Copper-Manganese-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 004
Revision Date: 05/07/2020 Date of Issue: 05/07/2020 | Version: 1.0

Nickel (7440-02-0)	
Listed on the United States TSCA (Toxic Substances Control Act) Inventory- subject to reporting requirements of US SARA Section 313	
CERCLA RQ	100 lb (only applicable if particles are <100µm)
SARA Section 313- Emission Reporting	0.1%

15.3 US State Regulations:

Manganese (7439-96-5)
US- Massachusetts-Right to Know Hazardous Substances List
US- Pennsylvania-Right to Know Environmental Hazard List
US- Pennsylvania- Right to Know Special Hazardous Substances
US- Pennsylvania- Right to Know List
US- Rhode Island- Right to Know Hazardous Substances List

Copper (7440-50-8)
US- Pennsylvania-Right to Know Environmental Hazard List
US- Pennsylvania- Right to Know Special Hazardous Substances
US- Pennsylvania- Right to Know List
US- Rhode Island- Right to Know Hazardous Substances List

Nickel (7440-02-0)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

SECTION 16: OTHER INFORMATION

Date of Preparation or Latest Revision: 5/07/2020

Other Information:

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on international, national, and community regulations. The mixture must not be used for other uses than those specified in section 1 without having first obtained written handling instructions. It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations. The information in this safety data sheet must be regarded as a description of the safety requirements relating to the mixture and not as a guarantee of the properties thereof.

Vista Metals, Inc believes that the information in this safety data sheet is accurate. However, Vista Metals, Inc makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.



Copper-Manganese-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 004
Revision Date: 05/07/2020 Date of Issue: 05/07/2020 | Version: 1.0

H&P Phrases:

H317- May cause an allergic skin reaction.
H334- May cause allergy or asthma symptoms or breathing difficulties if inhaled
H351- Suspected of causing cancer.
H372- Causes damage to organs through prolonged or repeated exposure.
H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).
P201- Obtain special instructions before use.
P202- Do not handle until all safety precautions have been read and understood.
P260- Do not breathe dust/fume/gas/mist/vapors/spray.
P264- Wash.... Thoroughly after handling.
P270- Do not eat, drink or smoke when using this product.
P272- Contaminated work clothing should not be allowed out of the workplace.
P280- Wear protective gloves/protective clothing/eye protection/face protection
P281- Use personal protective equipment as required.
P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
P308 & P313- IF exposed or concerned: Get medical advice/attention.
P314- Get medical advice/attention if you feel unwell.
P321- Specific treatment (see... on this label)
P333 & P313- If irritation or rash occurs, get medical advice/attention.
P362 & P364- Take off contaminated clothing and wash it before use.
P405- Store locked up.
P273- Avoid release to the environment
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

Abbreviations:

ACGIH: American Conference of Governmental Industrial Hygienists
ADR: Alternative Dispute Resolution
AGW: Arbeitsplatzgrenzwerte (occupational exposure limits)
CARC 2: Carcinogenicity category 2
CERCLA RQ: Comprehensive Environmental Response, Compensation, and Liability Act Requirements
DGR: Danger
EC50: Half maximal effective concentration
GHS07: Exclamation mark
GHS08: Health Hazard
IATA: International Air Transport Association
IARC: International Agency for Research on Cancer
IDLH: Immediately dangerous to life or health
IMDG: International Maritime Dangerous Goods
INRS: Institute National de la Recherche Scientifique
LC50: Concentration of material in feed or water that is lethal for 50% of exposed population
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PBT: Persistent, bioaccumulate and toxic
PEL: Permissible Exposure Limit
RID: Regulations concerning the International Carriage of Dangerous goods by Rail
SARA: The superfund Amendments and Reauthorization Act
SKIN SENS. 1: Skin sensitivity category 1
STOT RE 1: Specific Target Organ Toxicity Repeated Exposure
SVHC: Substance of Very High Concern
TLV: Threshold Limit Value
vPvB: Very persistent, very bioaccumulate
WEL: Workplace Exposure Limits

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

1.1 Product Identifier (s)

Product Name: Nickel Plated Carbon Steel (NPS)
 Chemical Name: Metal Alloy(s)
 Chemical Family: Iron Strip, Carbon Steel with Nickel Plating
 Trade Names/Alloy Designations: **Nickel Plated Steel (Alloy NPS)**

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

Metal Working- Ribbon, Strip. Raw material for: electrical & mechanical industry applications.

Use Descriptor system (REACH):

PC7: Base metals and alloys

1.3 Details of the Supplier of Safety Data Sheet

Company

Vista Metals, Inc
 65 Ballou Blvd
 Bristol, RI 02809
 Phone: 401-253-1772 Fax: 401-253-1806
<https://vismet.com/>

1.4 Emergency Telephone Number

Vista Metals: 401-253-1772 Association/Organization: INRS/ORFILA <http://www.centres-antipoison> Ph: +33 (0)1 45 42 59 59

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification with EC regulation No. 1272/2008 and its amendments

Skin Sensitivity-1 H317
 Carcinogenicity-2 H351
 STOT (repeated exposure)-1 H372

This substance does not present a physical hazard. Consult other references for additional products present on site. No known or foreseeable environmental damage under standard conditions of use.

Full text of hazard classes and H-statements: see Section 16.

2.2 Label Elements

In compliance with EC regulation No. 1272/2008 and its amendments

Hazard Pictograms (GHS)



Signal Word (GHS)

: WARNING

Hazard Statements

: H317- May cause an allergic skin reaction.
 H351- Suspected of causing cancer.
 H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).

Precautionary Statements (Prevention)

: P201- Obtain special instructions before use.
 P202- Do not handle until all safety precautions have been read and understood.
 P260- Do not breathe dust/fume/gas/mist/vapors/spray.
 P261- Avoid breathing dust/fume/gas/mist/vapors/spray
 P264- Wash.... Thoroughly after handling.
 P270- Do not eat, drink or smoke when using this product.
 P272- Contaminated work clothing should not be allowed out of the workplace.
 P280- Wear protective gloves/protective clothing/eye protection/face protection
 P281- Use personal protective equipment as required.

Precautionary Statements (Response)

: P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
 P308 & P313- IF exposed or concerned: Get medical advice/attention.
 P314- Get medical advice/attention if you feel unwell.
 P321- Specific treatment (see... on this label)
 P333 & P313- If irritation or rash occurs, get medical advice/attention.



Nickel Plated Carbon Steel

Safety Data Sheet Vista Metals' SDS Nbr: 005
Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 1.0

P362 & P364- Take off contaminated clothing and wash it before use.

Precautionary Statements (Storage) : P405- Store locked up.

Precautionary Statements (Disposal) : P273- Avoid release to the environment
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other Hazards

- **WARNING!** Exposure to dust or fumes can cause eye, skin, respiratory tract infection and flu-like illness. Inhalation or ingestion of dust or fumes can cause respiratory system damage. May cause an allergic skin reaction, and eye and mucous membrane irritation may occur. Contains materials that may cause cancer and/or nervous system effects. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. **Wash hands thoroughly after handling.**
- Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).
- The mixture does not contain substances classified as "Substances of Very High Concern" (SVHC) $\geq 0.1\%$ published by the European Chemicals Agency (ECHA) under article 57 of REACH: <http://echa.europa.edu/fr/candidate-list-table>
- This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.
- This substance may not require a label according to Article 17 (see section 1.3.3.2 of Annex I).
- Metals in massive form, alloys, mixtures containing polymers, and mixtures containing elastomers, do not require a label according to the provisions of this Annex, if they do not present a hazard to human health by inhalation, ingestion or contact with skin or to the aquatic environment in the form in which they are placed on the market, although classified in accordance with the criteria of this Annex.
- The supplier shall provide the information which shall have appeared on the label to downstream users or distributors in the safety data sheet.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Composition of Component

Name	Product Identifier	%	GHS Classification & EC 1272/2008
Nickel	INDEX: 028-002-00-7 CAS: 7440-02-0 EC: 231-111-4	X < 3	GHS08 • GHS07 • DGR • CARC. 2, H351 STOT RE 1, H372 • SKIN SENS. 1, H317
Iron	INDEX: --- CAS: 7439-89-6 EC: 231-096-4	90 ≤ X < 100	Comb. Dust

Full text of H-phrases, see Section 16



Nickel Plated Carbon Steel

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 005
Date of Issue: 07/20/2020 | Version: 1.0

3.1.2 Base Metal & Alloying Elements:

Components	CAS Nbr	Exposure Limits			
		ACGIH TLV (mg/m3)	OSHA PEL (mg/m3)		
Iron (Fe)	7439-89-6	5	Oxide Dust / Fume	10	Oxide Dust / Fume
Nickel (Ni)	7440-02-0	1.5	Metal	1	Metal and Insoluble Component
Chromium (Cr)	7440-47-3	0.5	Metals	1	Metal
Aluminum (Al)	7429-90-5	10 5	Dust Fume	15 5	Dust Respirable fraction
Boron (B)	7440-42-8	10	Oxide Dust	15	Oxide Dust
Carbon (C)	7440-44-0	-	Not Established	-	Not Established
Cobalt (Co)	7440-48-4	0.02	As Cobalt (A3 Carcinogen)	0.1	Metal / Dust / Fume
Copper (Cu)	7440-50-8	1 0.2	Dust Fume	1 0.1	Dust Fume
Lead (Pb)	7439-92-1	0.05	Dust/Fume (A3 Carcinogen)	0.05	Dust / Fume
Manganese(Mn)	7439-96-5	0.2	Elemental Mn & Inorganic Compounds	5	Insoluble Compounds
Molybdenum(Mo)	7439-98-7	10	Insoluble Compounds	15	Insoluble Compounds
Niobium (Nb)	7440-03-1	-	Not Established	-	Not Established
Phosphorous(P)	7723-14-0	0.1	Phosphorus	0.1	Phosphorus
Silicon (Si)	7440-21-3	10	Dust	15	Dust
Sulfur (S)	7446-09-05	5.2 13	Sulfur Dioxide Sulfur Dioxide (STEL)	13	Sulfur Dioxide
Titanium (Ti)	7440-32-6	-	Not Established	-	Not Established
Tungsten (W)	7440-33-7	5	Insoluble Compounds as W Insoluble Compounds as W (STEL)	-	Not Established
Vanadium (V)	7440-62-2	0.05	Oxide Dust / Fume	0.5 0.1	Oxide Dust (Ceiling) Oxide Fume (Ceiling)
Zinc (Zn)	7440-66-6	10 5 10	Oxide Dust Oxide Fume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measure:

General: As a general rule, in case of any doubt or if symptoms persist, always call a doctor.

NEVER induce swallowing by an unconscious person.

Inhalation: If inhaled, remove to fresh air and keep at rest in a comfortable breathing position. Get immediate medical attention if breathing difficulty persists or if person has stopped breathing.

Skin Contact: Remove contaminated clothing and wash skin with water and soap or recognized cleaner. Wash contaminated clothing before reuse. Watch out for any remaining product in skin, clothing, shoes, watches, etc. In the event of an allergic reaction, seek medical attention. If the contaminated area is widespread or there is damage to the skin, a doctor must be consulted or the patient transferred to hospital.

Eye Contact: Immediately rinse with water [eyes open] for at least 15 minutes. Remove contact lenses if present and easy to do- continue rinsing. If there is any redness, pain or visual impairment, obtain medical attention.

Ingestion: If swallowed, seek medical attention immediately and bring label or this safety sheet.

4.2 Most important symptoms and effects, both acute and delayed

General: Skin sensitization. May cause cancer. Under normal condition of use, this material is not anticipated to present a significant hazard. If metal dust is produced, it can cause irritation of the skin and respiratory tract and can be harmful.

Inhalation: If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Skin contact: Dust can get stuck in skin folds or by contact with tight clothing.

Eye Contact: Dust that is generated can get stuck in eye, along with slivers as well. Fumes, dust and slivers will most likely cause eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Chronic Symptoms: Nickel compounds and Metallic nickel may cause cancer. Is suspected of damaging an unborn child. Extended exposure to excessive concentrations of metal fumes and dusts can be associated in permanent changes in the lung function and pulmonary diseases.

- Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds



Nickel Plated Carbon Steel

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 005
Date of Issue: 07/20/2020 | Version: 1.0

Page | 4 of 11

are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).

4.3 Indication of any immediate medical attention and special treatment needed

In case of injury, make sure the person is up to date with anti-tetanus vaccine. If medical advice is necessary, bring label or safety sheet with you.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media: Non-flammable in massive form. Only dust generated by the processing of metal may be flammable. Do not use water when molten material is involved. The combination of hot product and water will result in an extreme explosion.

5.2 Special hazards arising from the substance or mixture: A fire will often produce a thick, black smoke. Exposure to decomposition byproducts may be hazardous to health. Do not breathe in smoke. Fumes may cause metal fumes fever. **DO NOT use water on molten metal: an explosion hazard could result. DO NOT BREATHE IN SMOKE!**

5.3 Advice for firefighters: Use self-contained breathing apparatus (NIOSH-approved) and full protective clothing must be worn in case of fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, protective equipment & emergency procedures:

- Consult the safety measures listed under sections 7 & 8.
- For non fire-fighters: Avoid any contact with the skin and eyes.
- For fire-fighters: Be equipped with suitable personal protective equipment (see section 8).

6.2 Environmental precautions:

- Prevent any material from entering drains or waterways.

6.3 Methods and material for containment and cleaning up:

- Retrieve the product by mechanical means [sweeping/vacuuming].
- Stop the flow of material if you are without risk.

6.4 Reference to other sections:

- For safety measures and personal protection, see sections 7 & 8.

SECTION 7: HANDLING AND STORAGE

Requirements relating to storage remises apply to all facilities where the mixture is handled.

Individuals with a history of skin sensitization should not, under any circumstances, handle this mixture.

7.1 Precautions for safe handling:

- Always wash hands after handling.
- The appropriate industrial and environmental safety measures must be taken for processing steps which cause dust (see also section 8).
- Ensure proper ventilation/exhaustion at the workplace.
- Take note of emission threshold.
- Remove and wash contaminated clothing before re-using.

Fire Prevention:

- Prevent access by unauthorized personnel.

Recommended equipment and procedures:

- For personal protection, see section 8.

Prohibited equipment and procedures:

- No smoking, eating or drinking in areas where the mixture is used.

7.2 Conditions for safe storage, including any incompatibilities:

- Store in dry and ventilated area.
- Do not store in a corrosive environment to avoid alloy's oxidation.
- Packaging: Always keep in packaging made of an identical material to the original.

7.3 Specific end use(s): No data available



Nickel Plated Carbon Steel

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 005
Date of Issue: 07/20/2020 | Version: 1.0

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters:

Occupational exposure limits:

Nickel (7440-02-0)		
USA ACGIH	ACGIH TWA (mg/m ³)	1.5 mg/m ³ – as inhalable fraction
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.015 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	10mg Ni/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³
Iron (7439-89-6)		
USA ACGIH	ACGIH TWA (mg/m ³)	Not Reported
USA OSHA	OSHA PEL (TWA) (mg/m ³)	Not Reported
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	Not Reported
USA IDLH	USA IDLH (mg/m ³)	Not Reported
FRANCE	INRS-ED984 (VME) (mg/m ³)	Not Reported
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	Not Reported
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	Not Reported

DNEL (Derived No Effect Level):

Nickel (7440-02-0)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	11.9 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.05mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.05mg Ni/m ³
General Population	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	0.37 mg Ni ion/kgbw/day
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	0.8 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.00006mg Ni/m ³
		Oral	0.011mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.00006mg Ni/m ³

Iron (7439-89-6)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Local Effects	Dermal	No hazard identified



Nickel Plated Carbon Steel

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 005
Date of Issue: 07/20/2020 | Version: 1.0

		Inhalation	3mg/m ³
General Population	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	0.71 mg/kg bw/day
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified

PNEC (Predicted No Effect Concentration):

Nickel (7440-02-0)	
Freshwater	7.1 µg/L
Marine Water	8.6 µg/L
Sewage Treatment	0.33 µg/L
Terrestrial Organisms	29.9 mg/kg soil dw
Predators (secondary poisoning)	0.12 mg/kg food

Iron (7439-89-6)	
Freshwater	No data; unlikely aquatic toxicity
Marine Water	No data; unlikely aquatic toxicity
Sewage Treatment	No data; unlikely aquatic toxicity
Terrestrial Organisms	The mixture is not classified as toxic or harmful
Predators (secondary poisoning)	Insufficient hazard data available (further info necessary)

8.2 Exposure Controls

Personal Protection measures, such as personal protective equipment:

- Use personal protective equipment that is clean and has been properly maintained.
- Store personal protective equipment in a clean place, away from the work area.
- Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using.
- Ensure that there is adequate ventilation, especially in confined areas.

Eye/Face Protection:

- Avoid contact with eyes.
- Wearing glasses is recommended- especially before handling powders or dust emission in accordance with standard ANSI A87, EN 166

Hand Protection:

- Wear suitable protective gloves in the event of prolonged or repeated skin contact.
- Gloves must be selected according to the application and during use at the workstation.
- Use gloves that are resistant to chemical agents in accordance to standard EN ISO 374.
- Protective gloves need to be selected according to their suitability for the workstation in question: other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required. Cut-resistant gloves should be in accordance with standard EN 388 & EN 420

Body Protection:

- Avoid skin contact.
- Wear suitable protective clothing.
- Work clothing worn by personnel shall be laundered regularly.
- After contact with the product, all parts of the body that have been soiled must be washed.

Respiratory Protection:

- Avoid breathing dust.
- If the ventilation is insufficient, wear appropriate breathing apparatus.
- Time limits for wearing must be observed.



Nickel Plated Carbon Steel

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 005
Date of Issue: 07/20/2020 | Version: 1.0

- When workers are confronted with concentrations that are above occupational exposure limits, they must wear a suitable, approved respiratory protection device.
- Wear a mask that is in accordance to category FFP3 standard EN149.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

General information:

Physical State- Solid

Color- Metallic, Silver/Gray, dull to shiny

Important health, safety and environmental information:

pH- not relevant

Boiling Point/Boiling Range- approximately 2730°C (4946°F)

Flash point interval- Not relevant

Vapor Pressure- Not relevant

Density- 8.0 g/cm³ (0.300 lbs/in³)

Water Solubility- Insoluble

Melting Point/Melting Range- 1450°C (2642°F)

Self-ignition temperature- Not specified

Decomposition point/decomposition range- Not specified

9.2 Other Information: No data available.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Massive metal is stable and not reactive under normal conditions of use, storage and transport.

10.2 Chemical Stability

This element/mixture is stable under the recommended handling and storage conditions in section 7.

10.3 Possibility of Hazardous Reactions

Hydrogen is released in contact with acid which can cause explosive gas mixtures.

10.4 Conditions to Avoid

Formation of dusts and humidity.

10.5 Incompatible Materials

Keep away from: Acids & Strong Oxidizing Agents

10.6 Hazardous Decomposition Products

The thermal decomposition (welding, burning, brazing) may release or form metal oxide fumes.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Inhalation: May cause allergy or asthma symptoms or breathing difficulties. Inhalation or ingestion of dust or fumes can cause respiratory system damage in the event of repeated or prolonged exposure. Suspected human carcinogen.

Skin Contact: Repeated or prolonged contact with the mixture may cause removal of natural oil from the skin resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact: Causes serious eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Symptoms related to the physical, chemical and toxicological characteristics: Eye irritation including stinging, tearing, redness, blurred vision and swelling. Difficulty breathing. Dermatitis and rash. If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Acute Toxicity: May cause an allergic skin reaction.

Skin corrosion/irritation: Prolonged contact can cause irritation.

Respiratory Sensitization: May cause breathing difficulty or asthma symptoms.

Germ Cell Mutagenicity: No data available.



Nickel Plated Carbon Steel

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 005
Date of Issue: 07/20/2020 | Version: 1.0

Carcinogenicity: Suspected of causing cancer.

Nickel (7440-02-0)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2- Suspected human carcinogen
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen List
US National Toxicology Program (NTP) Report on Carcinogens	Known to be a Human Carcinogen Reasonably anticipated to be a Human Carcinogen

Iron (7439-89-6)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Listed
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Reproductive Toxicity: Repeated and prolonged exposure to fumes and dust created in processing this product may cause reproductive effects.

Chronic effects: May cause cancer. Is suspected of damaging an unborn child. Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation.

11.2 Information on Toxicological Effects- Ingredient(s)

Nickel (7440-02-0)	
LD50 Oral	>9000 mg/kg/bw
LC50 Inhalation	>10.2mg/L

Iron (7439-89-6)	
LD50 Oral	98,600 mg/kg bw
LC50 Inhalation	>0.25mg/L

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Do not flush into water or sewer system. Do not empty into drains. This product contains substances which are hazardous to the environment.

Nickel (7440-02-0)	
EC50 Freshwater Algae	0.174 - 0.311 mg/L (exposure 96h) Pseudokirchneriella subcapitata
EC50 Freshwater Algae	=0.18 mg/L (exposure 72h) Pseudokirchneriella subcapitata
LC50 Freshwater Fish	= 10.4mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	= 1.3mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	>100mg/L (exposure 96h) Brachydanio rerio
EC50 Water Flea	=1mg/L (exposure 48h) Daphnia magna
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia magna

Iron (7439-89-6)	
EC50 Microorganisms	>10,000 mg/L (exposure 3h) Activated sludge
LC50 Freshwater Fish	>10,000 mg/L (exposure 96h) Danio rerio
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia Magna

12.2 Persistence & Degradability: Insoluble in water.

12.3 Bioaccumulation/Accumulation: Not biodegradable.

12.4 Mobility in soil: Nickel in massive form is not mobile in the environment.

12.5: Results of PBT and vPvB Assessment: This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.

12.6 Other adverse effects: Avoid unnecessary release into the environment. Alloys in solid form do not pose an ecological threat.



Nickel Plated Carbon Steel

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 005
Date of Issue: 07/20/2020 | Version: 1.0

SECTION 13: DISPOSAL CONSIDERATIONS

Scrap related to metal processing are recovered materials.

13.1 Waste Treatment Methods:

- Do not pour into drains or waterways. Dispose of in accordance with local regulations.

Waste:

- Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.
- Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector.
- Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

Soiled Packaging:

- Give to a certified disposal contractor.

SECTION 14: TRANSPORTATION INFORMATION

Exempt from transport classification and labeling.

ADR, RID, AND, IATA, IMDG- This product is not covered by international regulations on the transport of dangerous goods.

SECTION 15: REGULATORY INFORMATION

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

Classification and labeling information included in section 2:

The following regulations have been used:

EU Regulation No. 1272/2008 amended by EU Regulation No. 2018/1480

Regulation (EC) No 1907/2006 Annex XVII

Container information:

None available

Usage restrictions apply to the product: See Annex XVII of EC Regulation No. 1907/2006:

For professional users only

Particular provisions:

In accordance with Article 1.3.4 of Annex I of 1272/2008/CE regulations, metals and alloys in massive form do not require a label. Although classified as hazardous according to criteria of the directive, some of these substances are not hazardous for human health by inhalation, ingestion or skin contact, or hazardous to the aquatic environment in the form in which they are placed on the market.

15.2 US Federal Regulations:

Nickel- Iron Alloy	
SARA Section 311/312 Hazard Classes	Acute & Delayed Health Hazard

Nickel (7440-02-0)	
Listed on the United States TSCA (Toxic Substances Control Act) Inventory- subject to reporting requirements of US SARA Section 313	
CERCLA RQ	100 lb (only applicable if particles are <100µm)
SARA Section 313- Emission Reporting	0.1%

Molybdenum (7439-98-7)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	Not Listed

15.3 US State Regulations:

Nickel (7440-02-0)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	



Nickel Plated Carbon Steel

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 005
Date of Issue: 07/20/2020 | Version: 1.0

US- Pennsylvania- Right to Know List
US- Rhode Island- Right to Know Hazardous Substances List

Iron (7439-89-6)
Not Listed

Molybdenum (7439-98-7)
US- Massachusetts-Right to Know List
UA-New Jersey- Right to Know List
US- Pennsylvania-Right to Know Environmental Hazard List
US- Pennsylvania- Right to Know Special Hazardous Substances

SECTION 16: OTHER INFORMATION

Date of Preparation or Latest Revision: 7/20/2020

Other Information:

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on international, national, and community regulations. The mixture must not be used for other uses than those specified in section 1 without having first obtained written handling instructions. It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations. The information in this safety data sheet must be regarded as a description of the safety requirements relating to the mixture and not as a guarantee of the properties thereof.

Vista Metals, Inc believes that the information in this safety data sheet is accurate. However, Vista Metals, Inc makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.

H&P Phrases:

- H317- May cause an allergic skin reaction.
- H351- Suspected of causing cancer.
- H372- Causes damage to organs through prolonged or repeated exposure.
- H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).
- P201- Obtain special instructions before use.
- P202- Do not handle until all safety precautions have been read and understood.
- P260- Do not breathe dust/fume/gas/mist/vapors/spray.
- P261- Avoid breathing dust/fume/gas/mist/vapors/spray.
- P264- Wash... Thoroughly after handling.
- P270- Do not eat, drink or smoke when using this product.
- P272- Contaminated work clothing should not be allowed out of the workplace.
- P280- Wear protective gloves/protective clothing/eye protection/face protection
- P281- Use personal protective equipment as required.
- P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
- P308 & P313- IF exposed or concerned: Get medical advice/attention.
- P314- Get medical advice/attention if you feel unwell.
- P321- Specific treatment (see... on this label)
- P333 & P313- If irritation or rash occurs, get medical advice/attention.
- P362 & P364- Take off contaminated clothing and wash it before use.
- P405- Store locked up.
- P273- Avoid release to the environment
- P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

Abbreviations:

- ACGIH: American Conference of Governmental Industrial Hygienists
- ADR: Alternative Dispute Resolution
- AGW: Arbeitsplatzgrenzwerte (occupational exposure limits)
- CARC 2: Carcinogenicity category 2
- CERCLA RQ: Comprehensive Environmental Response, Compensation, and Liability Act Requirements
- DGR: Danger



Nickel Plated Carbon Steel

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 005
Date of Issue: 07/20/2020 | Version: 1.0

EC50: Half maximal effective concentration
GHS07: Exclamation mark
GHS08: Health Hazard
IATA: International Air Transport Association
IARC: International Agency for Research on Cancer
IDLH: Immediately dangerous to life or health
IMDG: International Maritime Dangerous Goods
INRS: Institute National de la Recherche Scientifique
LC50: Concentration of material in feed or water that is lethal for 50% of exposed population
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PBT: Persistent, bioaccumulate and toxic
PEL: Permissible Exposure Limit
RID: Regulations concerning the International Carriage of Dangerous goods by Rail
SARA: The superfund Amendments and Reauthorization Act
SKIN SENS. 1: Skin sensitivity category 1
STOT RE 1: Specific Target Organ Toxicity Repeated Exposure
SVHC: Substance of Very High Concern
TLV: Threshold Limit Value
vPvB: Very persistent, very bioaccumulate
WEL: Workplace Exposure Limits

END

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

1.1 Product Identifier (s)

Product Name: Copper-Nickel Alloys

Chemical Family: Metal Alloys

Synonyms: Copper-Nickel, Copper-Nickel Filler Metals

Trade Names/Alloy Designations: **30, 30C, 60, 60C, 67FM (813), 90, 90C, 180, 180C, 294, 295, 401, 401C, 413FM, 7025, 706, 710, 715, 7158, 792,19010, AP1, AP1C, AP1D,AP4, SICS**

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

Metal Working- Bar, Rod, Wire, Strip & Cut Lengths; some are also used as welding filler metals.

Use Descriptor system (REACH):

PC7: Base metals and alloys

1.3 Details of the Supplier of Safety Data Sheet

Company

Vista Metals, Inc

65 Ballou Blvd

Bristol, RI 02809

Phone: 401-253-1772 Fax: 401-253-1806

<https://vismet.com/>

1.4 Emergency Telephone Number

Vista Metals: 401-253-1772

Association/Organization: INRS/ORFILA <http://www.centres-antipoison>

Ph: +33 (0)1 45 42 59 59

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification with EC regulation No. 1272/2008 and its amendments

Skin Sensitivity-1 H317

Carcinogenicity-2 H351

STOT (repeated exposure)-1 H372

This substance does not present a physical hazard. Consult other references for additional products present on site. No known or foreseeable environmental damage under standard conditions of use.

Full text of hazard classes and H-statements: see Section 16.

2.2 Label Elements

In compliance with EC regulation No. 1272/2008 and its amendments

Hazard Pictograms (GHS) :



Signal Word (GHS) :

DANGER

Hazard Statements :

H317- May cause an allergic skin reaction.

H351- Suspected of causing cancer.

H372- Causes damage to organs through prolonged or repeated exposure (if inhaled).

Precautionary Statements (Prevention) :

P201- Obtain special instructions before use.

P202- Do not handle until all safety precautions have been read and understood.

P260- Do not breathe dust/fume/gas/mist/vapors/spray.

P261- Avoid breathing dust/fume/gas/mist/vapors/spray

P264- Wash.... Thoroughly after handling.

P270: Do not eat, drink or smoke when using this product.

P272- Contaminated work clothing should not be allowed out of the workplace.

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

P281- Use personal protective equipment as required.

Precautionary Statements (Response) :

P302 & P352- IF ON SKIN- Wash with plenty of soap and water.

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

P314- Get medical advice/attention if you feel unwell

P333 & P313- If irritation or rash occurs, get medical advice/attention.



Copper-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 006
Revision Date: 06/08/2020 Date of Issue: 06/08/2020 | Version: 1.0

P362 & P364- Take off contaminated clothing and wash it before use.

Precautionary Statements (Storage) : P405- Store locked up.

Precautionary Statements (Disposal) : P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other Hazards

- **WARNING!** Exposure to dust or fumes can cause eye, skin, respiratory tract infection and flu-like illness. Inhalation or ingestion of dust or fumes can cause respiratory system damage. May cause an allergic skin reaction, and eye and mucous membrane irritation may occur. Contains materials that may cause cancer and/or nervous system effects. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. **Wash hands thoroughly after handling.**
- Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).
- The mixture does not contain substances classified as "Substances of Very High Concern" (SVHC) $\geq 0.1\%$ published by the European Chemicals Agency (ECHA) under article 57 of REACH: <http://echa.europa.edu/fr/candidate-list-table>
- This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.
- This substance may not require a label according to Article 17 (see section 1.3.3.2 of Annex I).
- Metals in massive form, alloys, mixtures containing polymers, and mixtures containing elastomers, do not require a label according to the provisions of this Annex, if they do not present a hazard to human health by inhalation, ingestion or contact with skin or to the aquatic environment in the form in which they are placed on the market, although classified in accordance with the criteria of this Annex.
- The supplier shall provide the information which shall have appeared on the label to downstream users or distributors in the safety data sheet.
- Hazards not otherwise classified (HNOC) Harmful to aquatic organisms.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Composition of Component

Name	Product Identifier	%	GHS Classification & EC 1272/2008
Copper	INDEX: 7440-50-8 CAS: 7440-50-8 EC: 231-159-6 REACH: 1-2119480154-42	$50 \leq X < 100$	Comb. Dust- Maximum WELs are available
Nickel	INDEX: 028-002-00-7 CAS: 7440-02-0 EC: 231-111-4	$25 \leq X < 50$	GHS08 • GHS07 • DGR • CARC. 2, H351 STOT RE 1, H372 • SKIN SENS. 1, H317

Full text of H-phrases, see Section 16



Copper-Nickel Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 006
Date of Issue: 06/08/2020 | Version: 1.0

3.1.2 Base Metal & Alloying Elements:

Components	CAS Nbr	Exposure Limits			
		ACGIH TLV (mg/m3)	OSHA PEL (mg/m3)		
Iron (Fe)	7439-89-6	5	Oxide Dust / Fume	10	Oxide Dust / Fume
Nickel (Ni)	7440-02-0	1.5	Metal	1	Metal and Insoluble Component
Chromium (Cr)	7440-47-3	0.5	Metals	1	Metal
Aluminum (Al)	7429-90-5	10 5	Dust Fume	15 5	Dust Respirable fraction
Boron (B)	7440-42-8	10	Oxide Dust	15	Oxide Dust
Carbon (C)	7440-44-0	-	Not Established	-	Not Established
Cobalt (Co)	7440-48-4	0.02	As Cobalt (A3 Carcinogen)	0.1	Metal / Dust / Fume
Copper (Cu)	7440-50-8	1 0.2	Dust Fume	1 0.1	Dust Fume
Lead (Pb)	7439-92-1	0.05	Dust/Fume (A3 Carcinogen)	0.05	Dust / Fume
Manganese(Mn)	7439-96-5	0.2	Elemental Mn & Inorganic Compounds	5	Insoluble Compounds
Molybdenum(Mo)	7439-98-7	10	Insoluble Compounds	15	Insoluble Compounds
Niobium (Nb)	7440-03-1	-	Not Established	-	Not Established
Phosphorous(P)	7723-14-0	0.1	Phosphorus	0.1	Phosphorus
Silicon (Si)	7440-21-3	10	Dust	15	Dust
Sulfur (S)	7446-09-05	5.2 13	Sulfur Dioxide Sulfur Dioxide (STEL)	13	Sulfur Dioxide
Titanium (Ti)	7440-32-6	-	Not Established	-	Not Established
Tungsten (W)	7440-33-7	5	Insoluble Compounds as W Insoluble Compounds as W (STEL)	-	Not Established
Vanadium (V)	7440-62-2	0.05	Oxide Dust / Fume	0.5 0.1	Oxide Dust (Ceiling) Oxide Fume (Ceiling)
Zinc (Zn)	7440-66-6	10 5 10	Oxide Dust Oxide Fume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measure:

General: As a general rule, in case of any doubt or if symptoms persist, always call a doctor.

NEVER induce swallowing by an unconscious person.

Inhalation: If inhaled, remove to fresh air and keep at rest in a comfortable breathing position. Get immediate medical attention if breathing difficulty persists or if person has stopped breathing.

Skin Contact: Remove contaminated clothing and wash skin with water and soap or recognized cleaner. Wash contaminated clothing before reuse. Watch out for any remaining product in skin, clothing, shoes, watches, etc. In the event of an allergic reaction, seek medical attention. If the contaminated area is widespread or there is damage to the skin, a doctor must be consulted or the patient transferred to hospital.

Eye Contact: Immediately rinse with water [eyes open] for at least 15 minutes. Remove contact lenses if present and easy to do- continue rinsing. If there is any redness, pain or visual impairment, obtain medical attention.

Ingestion: If swallowed, seek medical attention immediately and bring label or this safety sheet. Not an expected route of exposure.

4.2 Most important symptoms and effects, both acute and delayed

General: Skin sensitization. May cause cancer. Is suspected of damaging an unborn child. Under normal condition of use, this material is not anticipated to present a significant hazard. If metal dust is produced, it can cause irritation of the skin and respiratory tract and can be harmful.

Inhalation: If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Skin contact: Dust can get stuck in skin folds or by contact with tight clothing.

Eye Contact: Dust that is generated can get stuck in eye, along with slivers as well. Fumes, dust and slivers will most likely cause eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.



Copper-Nickel Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 006
Date of Issue: 06/08/2020 | Version: 1.0

Page | 4 of 11

Chronic Symptoms: Nickel compounds and Metallic nickel may cause cancer. Is suspected of damaging an unborn child. Extended exposure to excessive concentrations of metal fumes and dusts can be associated in permanent changes in the lung function and pulmonary diseases.

- Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).

4.3 Indication of any immediate medical attention and special treatment needed

In case of injury, make sure the person is up to date with anti-tetanus vaccine. If medical advice is necessary, bring label or safety sheet with you.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media: Non-flammable in massive form. Only dust generated by the processing of metal may be flammable. Do not use water when molten material is involved. The combination of hot product and water will result in an extreme explosion.

5.2 Special hazards arising from the substance or mixture: A fire will often produce a thick, black smoke. Exposure to decomposition byproducts may be hazardous to health. Do not breathe in smoke. Fumes may cause metal fumes fever. **DO NOT use water on molten metal: an explosion hazard could result. DO NOT BREATHE IN SMOKE!**

5.3 Advice for firefighters: Use self-contained breathing apparatus (NIOSH-approved) and full protective clothing must be worn in case of fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, protective equipment & emergency procedures:

- Consult the safety measures listed under sections 7 & 8.
- For non fire-fighters: Avoid any contact with the skin and eyes.
- For fire-fighters: Be equipped with suitable personal protective equipment (see section 8).

6.2 Environmental precautions:

- Prevent any material from entering drains or waterways.

6.3 Methods and material for containment and cleaning up:

- Retrieve the product by mechanical means [sweeping/vacuuming].
- Stop the flow of material if you are without risk.

6.4 Reference to other sections:

- For safety measures and personal protection, see sections 7 & 8.

SECTION 7: HANDLING AND STORAGE

Requirements relating to storage remises apply to all facilities where the mixture is handled.

Individuals with a history of skin sensitization should not, under any circumstances, handle this mixture.

7.1 Precautions for safe handling:

- Always wash hands after handling.
- Remove and wash contaminated clothing before re-using.

Fire Prevention:

- Prevent access by unauthorized personnel.

Recommended equipment and procedures:

- For personal protection, see section 8.
- Avoid inhaling dust.
- Also provide breathing apparatus for certain short tasks of an exceptional nature and for emergency interventions.
- In all cases, recover emissions at source.

Prohibited equipment and procedures:

- No smoking, eating or drinking in areas where the mixture is used.

7.2 Conditions for safe storage, including any incompatibilities:

- Store in dry and ventilated area.
- Do not store in a corrosive environment to avoid alloy's oxidation.
- Packaging: Always keep in packaging made of an identical material to the original.



Copper-Nickel Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 006
Date of Issue: 06/08/2020 | Version: 1.0

7.3 Specific end use(s): No data available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters:

Occupational exposure limits:

Copper (7440-50-8)		
USA ACGIH	ACGIH TWA (mg/m ³)	1 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1 mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	1 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	No evidence [*"Effective" IDLH=2,000mg Cu/m ³]
FRANCE	INRS-ED984 (VME) (mg/m ³)	Not Reported
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0.11 mg/m ³ [ceiling 0.21mg/ m ³]
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.2 mg/ m ³

Nickel (7440-02-0)		
USA ACGIH	ACGIH TWA (mg/m ³)	1.5 mg/m ³ – as inhalable fraction
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.015 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	10mg Ni/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³

DNEL (Derived No Effect Level):

Copper (7440-50-8)				
Workers	Acute- Systemic Effects	Dermal	273 mg/kg/bw/day	
		Inhalation	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	1mg/m ³	
		Ocular	No hazard identified	
	Long-term- Systemic Effects	Dermal	137 mg/kg/bw/day	
		Inhalation	No hazard identified	
	Long-term- Local Effects	Dermal	No hazard identified	
		Inhalation	1 mg/m ³	
	General Population	Acute- Systemic Effects	Dermal	273 mg/kg/bw/day
			Inhalation	No hazard identified
			Oral	Low hazard [no threshold derived]
Acute- Local Effects		Dermal	No hazard identified	
		Inhalation	1mg/m ³	
Long-term- Systemic Effects		Dermal	137 mg/kg/bw/day	
		Inhalation	No hazard identified	
		Oral	0.041 mg/kg/bw/day	
Long-term- Local Effects		Dermal	No hazard identified	
		Inhalation	1mg/m ³	



Copper-Nickel Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 006
Date of Issue: 06/08/2020 | Version: 1.0

Nickel (7440-02-0)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	11.9 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.05mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.05mg Ni/m ³
General Population	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	0.37 mg Ni ion/kgbw/day
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	0.8 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.00006mg Ni/m ³
		Oral	0.011mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.00006mg Ni/m ³

PNEC (Predicted No Effect Concentration):

Copper (7440-50-8)	
Freshwater	7.8 µg/L
Marine Water	5.2 µg/L
Sewage Treatment	230 mg/L
Terrestrial Organisms	65 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation

Nickel (7440-02-0)	
Freshwater	7.1 µg/L
Marine Water	8.6 µg/L
Sewage Treatment	0.33 µg/L
Terrestrial Organisms	29.9 mg/kg soil dw
Predators (secondary poisoning)	0.12 mg/kg food

8.2 Exposure Controls

Personal Protection measures, such as personal protective equipment:

- Use personal protective equipment that is clean and has been properly maintained.
- Store personal protective equipment in a clean place, away from the work area.
- Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using.
- Ensure that there is adequate ventilation, especially in confined areas.

Eye/Face Protection:

- Avoid contact with eyes.
- Wearing glasses is recommended- especially before handling powders or dust emission in accordance with standard ANSI A87, EN 166

Hand Protection:

- Wear suitable protective gloves in the event of prolonged or repeated skin contact.
- Gloves must be selected according to the application and during use at the workstation.
- Protective gloves need to be selected according to their suitability for the workstation in question: other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required. Cut-resistant gloves should be in accordance with standard EN 388 & EN 420



Copper-Nickel Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 006
Date of Issue: 06/08/2020 | Version: 1.0

Body Protection:

- Avoid skin contact.
- Wear suitable protective clothing.
- Work clothing work by personnel shall be laundered regularly.
- After contact with the product, all parts of the body that have been soiled must be washed.

Respiratory Protection:

- Avoid breathing dust.
- If the ventilation is insufficient, wear appropriate breathing apparatus.
- When workers are confronted with concentrations that are above occupational exposure limits, they must wear a suitable, approved respiratory protection device.
- Wear a mask that is in accordance to category FFP3 standard EN149.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

General information:

Physical State- Solid

Color- Light metallic silverfish-orange to orangish-brown

Important health, safety and environmental information:

pH- Not relevant

Boiling Point/Boiling Range- Not relevant

Flash point interval- Not relevant

Vapor Pressure- Not relevant

Density- 8.9 g/cm³ (0.321533 lbs/in³)

Water Solubility- Insoluble

Melting Point/Melting Range- 1200°C to 1290°C (2192°F to 2354°F)

Self-ignition temperature- Not specified

Decomposition point/decomposition range- Not specified

9.2 Other Information: No data available.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Massive metal is stable and not reactive under normal conditions of use, storage and transport.

10.2 Chemical Stability

This element/mixture is stable under the recommended handling and storage conditions in section 7.

10.3 Possibility of Hazardous Reactions

No data available

10.4 Conditions to Avoid

Formation of dusts and humidity. Dusts can form an explosive mixture with air.

10.5 Incompatible Materials

Keep away from: Acids & Strong Oxidizing Agents

10.6 Hazardous Decomposition Products

The thermal decomposition (welding, burning, brazing) may release or form metal oxide fumes.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Inhalation: May cause allergy or asthma symptoms or breathing difficulties. Inhalation or ingestion of dust or fumes can cause respiratory system damage in the event of repeated or prolonged exposure. Suspected human carcinogen.

Skin Contact: Repeated or prolonged contact with the mixture may cause removal of natural oil from the skin resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact: Causes serious eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.



Copper-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 006
Revision Date: 06/08/2020 Date of Issue: 06/08/2020 | Version: 1.0

Symptoms related to the physical, chemical and toxicological characteristics: Eye irritation including stinging, tearing, redness, blurred vision and swelling. Difficulty breathing. Dermatitis and rash. If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Acute Toxicity: May cause an allergic skin reaction.

Skin corrosion/irritation: Prolonged contact can cause irritation.

Respiratory Sensitization: May cause breathing difficulty or asthma symptoms.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: Suspected of causing cancer.

Copper (7440-50-8)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Nickel (7440-02-0)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2- Suspected human carcinogen
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen List
US National Toxicology Program (NTP) Report on Carcinogens	Known to be a Human Carcinogen Reasonably anticipated to be a Human Carcinogen

Reproductive Toxicity: Repeated and prolonged exposure to fumes and dust created in processing this product may cause reproductive effects.

Chronic effects: May cause cancer. Is suspected of damaging an unborn child. Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation.

11.2 Information on Toxicological Effects- Ingredient(s)

Copper (7440-50-8)	
LD50 Oral	472 mg/kg bw
LC50 Inhalation	0.73 mg/L

Nickel (7440-02-0)	
LD50 Oral	>9000 mg/kg/bw
LC50 Inhalation	>10.2mg/L

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Do not flush into water or sewer system. Do not empty into drains. This product contains substances which are hazardous to the environment.

Copper (7440-50-8)	
EC50 Algae	0.0426-0.0535 mg/L (exposure 72h)
LC50 Freshwater Fish	0.15 mg/L (exposure 96h) <i>Oncorhynchus mykiss</i>
LC50 Freshwater Fish	0.8 mg/L (exposure 96h) <i>Cuprinus carpio</i>
EC50 Microorganisms	Not Listed
EC50 Water Flea	0.03 mg/L (exposure 48h) <i>Daphnia magna</i>

Nickel (7440-02-0)	
EC50 Freshwater Algae	0.174 - 0.311 mg/L (exposure 96h) <i>Pseudokirchneriella subcapitata</i>
EC50 Freshwater Algae	=0.18 mg/L (exposure 72h) <i>Pseudokirchneriella subcapitata</i>
LC50 Freshwater Fish	= 10.4mg/L (exposure 96h) <i>Cyprinus carpio</i>
LC50 Freshwater Fish	= 1.3mg/L (exposure 96h) <i>Cyprinus carpio</i>
LC50 Freshwater Fish	>100mg/L (exposure 96h) <i>Brachydanio rerio</i>



Copper-Nickel Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 006
Date of Issue: 06/08/2020 | Version: 1.0

EC50 Water Flea	=1mg/L (exposure 48h) Daphnia magna
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia magna

12.2 Persistence & Degradability: Insoluble in water.

12.3 Bioaccumulation/Accumulation: Not biodegradable.

12.4 Mobility in soil: Nickel in massive form is not mobile in the environment.

12.5: Results of PBT and vPvB Assessment: This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.

12.6 Other adverse effects: Avoid unnecessary release into the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Scrap related to metal processing are recovered materials.

13.1 Waste Treatment Methods:

- Do not pour into drains or waterways. Dispose of in accordance with local regulations.

Waste:

- Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.
- Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector.
- Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

Soiled Packaging:

- Give to a certified disposal contractor.

SECTION 14: TRANSPORTATION INFORMATION

Exempt from transport classification and labeling.

ADR, RID, AND, IATA, IMDG- This product is not covered by international regulations on the transport of dangerous goods.

SECTION 15: REGULATORY INFORMATION

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

Classification and labeling information included in section 2:

The following regulations have been used:

EU Regulation No. 1272/2008 amended by EC 790/2009

Container information:

None available

Usage restrictions apply to the product: See Annex XVII of EC Regulation No. 1907/2006:

For professional users only

Particular provisions:

In accordance with Article 1.3.4 of Annex I of 1272/2008/CE regulations, metals and alloys in massive form do not require a label. Although classified as hazardous according to criteria of the directive, some of these substances are not hazardous for human health by inhalation, ingestion or skin contact, or hazardous to the aquatic environment in the form in which they are placed on the market.

15.2 US Federal Regulations:

Copper (7440-50-8)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	0.1%

Nickel- Iron Alloy	
SARA Section 311/312 Hazard Classes	Acute & Delayed Health Hazard

Nickel (7440-02-0)	
Listed on the United States TSCA (Toxic Substances Control Act) Inventory- subject to reporting requirements of US SARA Section 313	
CERCLA RQ	100 lb (only applicable if particles are <100µm)
SARA Section 313- Emission Reporting	0.1%



Copper-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 006
Revision Date: 06/08/2020 Date of Issue: 06/08/2020 | Version: 1.0

15.3 US State Regulations:

Copper (7440-50-8)
US- Pennsylvania-Right to Know Environmental Hazard List
US- Pennsylvania- Right to Know Special Hazardous Substances
US- Pennsylvania- Right to Know List
US- Rhode Island- Right to Know Hazardous Substances List

Nickel (7440-02-0)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

SECTION 16: OTHER INFORMATION

Date of Preparation or Latest Revision: 6/8/2020

Other Information:

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on international, national, and community regulations. The mixture must not be used for other uses than those specified in section 1 without having first obtained written handling instructions. It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations. The information in this safety data sheet must be regarded as a description of the safety requirements relating to the mixture and not as a guarantee of the properties thereof.

Vista Metals, Inc believes that the information in this safety data sheet is accurate. However, Vista Metals, Inc makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.

H&P Phrases:

- H317- May cause an allergic skin reaction.
- H351- Suspected of causing cancer.
- H372- Causes damage to organs through prolonged or repeated exposure.
- H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).
- P201- Obtain special instructions before use.
- P202- Do not handle until all safety precautions have been read and understood.
- P260- Do not breathe dust/fume/gas/mist/vapors/spray.
- P261- Avoid breathing dust/fume/gas/mist/vapors/spray
- P264- Wash.... Thoroughly after handling.
- P270- Do not eat, drink or smoke when using this product.
- P272- Contaminated work clothing should not be allowed out of the workplace.
- P280- Wear protective gloves/protective clothing/eye protection/face protection
- P281- Use personal protective equipment as required.
- P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
- P308 & P313- IF exposed or concerned: Get medical advice/attention.
- P314- Get medical advice/attention if you feel unwell.
- P333 & P313- If irritation or rash occurs, get medical advice/attention.
- P362 & P364- Take off contaminated clothing and wash it before use.
- P405- Store locked up.
- P501- Dispose of contents/container in accordance with local/regional/national/international regulations.



Copper-Nickel Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 006
Date of Issue: 06/08/2020 | Version: 1.0

Abbreviations:

ACGIH: American Conference of Governmental Industrial Hygienists
ADR: Alternative Dispute Resolution
AGW: Arbeitsplatzgrenzwerte (occupational exposure limits)
CARC 2: Carcinogenicity category 2
CERCLA RQ: Comprehensive Environmental Response, Compensation, and Liability Act Requirements
DGR: Danger
EC50: Half maximal effective concentration
GHS07: Exclamation mark
GHS08: Health Hazard
IATA: International Air Transport Association
IARC: International Agency for Research on Cancer
IDLH: Immediately dangerous to life or health
IMDG: International Maritime Dangerous Goods
INRS: Institute National de la Recherche Scientifique
LC50: Concentration of material in feed or water that is lethal for 50% of exposed population
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PBT: Persistent, bioaccumulate and toxic
PEL: Permissible Exposure Limit
RID: Regulations concerning the International Carriage of Dangerous goods by Rail
SARA: The superfund Amendments and Reauthorization Act
SKIN SENS. 1: Skin sensitivity category 1
STOT RE 1: Specific Target Organ Toxicity Repeated Exposure
SVHC: Substance of Very High Concern
TLV: Threshold Limit Value
vPvB: Very persistent, very bioaccumulate
WEL: Workplace Exposure Limits

END

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

1.1 Product Identifier (s)

Product Name: Copper, Copper-Chrome, Copper Alloys
 Chemical Family: Mixture - Metal Alloys
 Synonyms: Copper Rich Alloys; UNS and CDA Alloys
 Trade Names/Alloy Designations: **110 (ETP Cu), 151 (Zirconium-Cu)**
Relevant identified uses of the substance or mixture and uses advised against
 Metal Working- Bar, Rod, Wire & Strip
Use Descriptor system (REACH):
 PC7: Base metals and alloys

1.2 Details of the Supplier of Safety Data Sheet

Company

Vista Metals, Inc
 65 Ballou Blvd
 Bristol, RI 02809
 Phone: 401-253-1772 Fax: 401-253-1806
<https://vismet.com/>

1.3 Emergency Telephone Number

Vista Metals: 401-253-1772 **Association/Organization:** INRS/ORFILA <http://www.centres-antipoison> **Ph:** +33 (0)1 45 42 59 59

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification with EC regulation No. 1272/2008 and its amendments

Skin Sensitivity-1 H317
 Carcinogenicity-2B H351
 STOT (repeated exposure)-1 H372

This substance does not present a physical hazard. Consult other references for additional products present on site. No known or foreseeable environmental damage under standard conditions of use.
 Full text of hazard classes and H-statements: see Section 16.

2.2 Label Elements

In compliance with EC regulation No. 1272/2008 and its amendments

Hazard Pictograms (GHS)



Signal Word (GHS)

: DANGER

Hazard Statements

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

Precautionary Statements (Prevention)

: P201- Obtain special instructions before use.
 P202- Do not handle until all safety precautions have been read and understood.
 P260- Do not breathe dust/fume/gas/mist/vapors/spray.
 P261- Avoid breathing dust/fume/gas/mist/vapors/spray
 P264- Wash.... Thoroughly after handling.
 P270- Do not eat, drink or smoke when using this product.
 P272- Contaminated work clothing should not be allowed out of the workplace.
 P280- Wear protective gloves/protective clothing/eye protection/face protection
 P281- Use personal protective equipment as required.

Precautionary Statements (Response)

: P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
 P308 & P313- IF exposed or concerned: Get medical advice/attention.
 P314- Get medical advice/attention if you feel unwell
 P333 & P313- If irritation or rash occurs, get medical advice/attention.
 P362 & P364- Take off contaminated clothing and wash it before use.



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 007
Revision Date: 08/10/2020 Date of Issue: 08/10/2020 | Version: 1.0

Precautionary Statements (Storage) : P405- Store locked up.

Precautionary Statements (Disposal) : P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other Hazards

- **WARNING!** Exposure to dust or fumes can cause eye, skin, respiratory tract infection and flu-like illness. Inhalation or ingestion of dust or fumes can cause respiratory system damage. May cause an allergic skin reaction, and eye and mucous membrane irritation may occur. Contains materials that may cause cancer and/or nervous system effects. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. **Wash hands thoroughly after handling.**
- The mixture does not contain substances classified as "Substances of Very High Concern" (SVHC) $\geq 0.1\%$ published by the European Chemicals Agency (ECHA) under article 57 of REACH: <http://echa.europa.edu/fr/candidate-list-table>
- This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.
- This substance may not require a label according to Article 17 (see section 1.3.3.2 of Annex I).
- Metals in massive form, alloys, mixtures containing polymers, and mixtures containing elastomers, do not require a label according to the provisions of this Annex, if they do not present a hazard to human health by inhalation, ingestion or contact with skin or to the aquatic environment in the form in which they are placed on the market, although classified in accordance with the criteria of this Annex.
- The supplier shall provide the information which shall have appeared on the label to downstream users or distributors in the safety data sheet.
- Hazards not otherwise classified (HNOC) Harmful to aquatic organisms.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Composition of Component

Name	Product Identifier	%	GHS Classification & EC 1272/2008
Copper	INDEX: 7440-50-8 CAS: 7440-50-8 EC: 231-159-6 REACH: 1-2119480154-42	$98 \leq X < 100$	Comb. Dust- Maximum WELs are available
Iron	INDEX: --- CAS: 7439-89-6 EC: 231-096-4	$X < 0.15$	Comb. Dust
Chromium	INDEX: --- CAS: 7440-47-3 EC: 231-157-5	$X < 0.5$	GHS08 • GHS07 • DGR • CARC. 3, H351 STOT RE 1, H372 • SKIN SENS. 1, H317 ACUTE TOX. (ORAL) 4, H302
Cobalt	INDEX: 027-001-00-9 CAS: 7440-48-4 EC: 231-158-0	$X < 0.25$	GHS08 • GHS07 • DGR • CARC. 2B, H351 STOT RE 1, H372 • SKIN SENS. 1, H317 ACUTE TOX. (ORAL) 4, H302
Phosphorous	INDEX: --- CAS: 7723-14-0 EC: 231-768-7	$X < 0.08$	FLAMMABLE SOLID, H228
Silicon	INDEX: --- CAS: 7440-21-3 EC: 231-130-8	$X < 0.15$	Comb. Dust

Full text of H-phrases, see Section 16



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 007
Revision Date: 08/10/2020 Date of Issue: 08/10/2020 | Version: 1.0

3.1.2 Base Metal & Alloying Elements:

Components	CAS Nbr	%	Exposure Limits			
			ACGIH TLV (mg/m3)		OSHA PEL (mg/m3)	
Copper (Cu)	7440-50-8	>99.0	1 0.2	Dust Fume	1 0.1	Dust Fume
Iron (Fe)	7439-89-6	<0.15	5	Oxide Dust / Fume	10	Oxide Dust / Fume
Chromium (Cr)	7440-47-3	<0.5	0.5	Metals	1	Metal
Cobalt (Co)	7440-48-4	<0.25	0.02	As Cobalt (A3 Carcinogen)	0.1	Metal / Dust / Fume
Phosphorous (P)	7723-14-0	<0.08	0.1	Phosphorous	0.1	Phosphorous
Silicon (Si)	7440-21-3	<0.15	10	Dust	15	Dust

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measure:

General: As a general rule, in case of any doubt or if symptoms persist, always call a doctor.

NEVER induce swallowing by an unconscious person.

Inhalation: If inhaled, remove to fresh air and keep at rest in a comfortable breathing position. Get immediate medical attention if breathing difficulty persists or if person has stopped breathing.

Skin Contact: Remove contaminated clothing and wash skin with water and soap or recognized cleaner. Wash contaminated clothing before reuse. Watch out for any remaining product in skin, clothing, shoes, watches, etc. In the event of an allergic reaction, seek medical attention. If the contaminated area is widespread or there is damage to the skin, a doctor must be consulted or the patient transferred to hospital.

Eye Contact: Immediately rinse with water [eyes open] for at least 15 minutes. Remove contact lenses if present and easy to do- continue rinsing. If there is any redness, pain or visual impairment, obtain medical attention.

Ingestion: If swallowed, seek medical attention immediately and bring label or this safety sheet. Not an expected route of exposure.

4.2 Most important symptoms and effects, both acute and delayed

General: Skin sensitization. May cause cancer. Is suspected of damaging an unborn child. Under normal condition of use, this material is not anticipated to present a significant hazard. If metal dust is produced, it can cause irritation of the skin and respiratory tract and can be harmful.

Inhalation: If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Skin contact: Dust can get stuck in skin folds or by contact with tight clothing.

Eye Contact: Dust that is generated can get stuck in eye, along with slivers as well. Fumes, dust and slivers will most likely cause eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Chronic Symptoms: Suspected of damaging an unborn child. Extended exposure to excessive concentrations of metal fumes and dusts can be associated in permanent changes in the lung function and pulmonary diseases. Can cause metal fume fever.

4.3 Indication of any immediate medical attention and special treatment needed

In case of injury, make sure the person is up to date with anti-tetanus vaccine. If medical advice is necessary, bring label or safety sheet with you.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media: Non-flammable in massive form. Only dust generated by the processing of metal may be flammable. Do not use water when molten material is involved. The combination of hot product and water will result in an extreme explosion.

5.2 Special hazards arising from the substance or mixture: A fire will often produce a thick, black smoke. Exposure to decomposition byproducts may be hazardous to health. Do not breathe in smoke. Fumes may cause metal fumes fever. **DO NOT use water on molten metal: an explosion hazard could result. DO NOT BREATHE IN SMOKE!**

5.3 Advice for firefighters: Use self-contained breathing apparatus (NIOSH-approved) and full protective clothing must be worn in case of fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, protective equipment & emergency procedures:

- Consult the safety measures listed under sections 7 & 8.
- For non fire-fighters: Avoid any contact with the skin and eyes.
- For fire-fighters: Be equipped with suitable personal protective equipment (see section 8).

6.2 Environmental precautions:

- Prevent any material from entering drains or waterways.



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 007
Revision Date: 08/10/2020 Date of Issue: 08/10/2020 | Version: 1.0

6.3 Methods and material for containment and cleaning up:

- Retrieve the product by mechanical means [sweeping/vacuuming].
- Stop the flow of material if you are without risk.

6.4 Reference to other sections:

- For safety measures and personal protection, see sections 7 & 8.

SECTION 7: HANDLING AND STORAGE

Requirements relating to storage remises apply to all facilities where the mixture is handled.

Individuals with a history of skin sensitization should not, under any circumstances, handle this mixture.

7.1 Precautions for safe handling:

- Always wash hands after handling.
- Remove and wash contaminated clothing before re-using.

Fire Prevention:

- Prevent access by unauthorized personnel.

Recommended equipment and procedures:

- For personal protection, see section 8.
- Avoid inhaling dust.
- Also provide breathing apparatus for certain short tasks of an exceptional nature and for emergency interventions.
- In all cases, recover emissions at source.

Prohibited equipment and procedures:

- No smoking, eating or drinking in areas where the mixture is used.

7.2 Conditions for safe storage, including any incompatibilities:

- Store in dry and ventilated area.
- Do not store in a corrosive environment to avoid alloy's oxidation.
- Packaging: Always keep in packaging made of an identical material to the original.

7.3 Specific end use(s): No data available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters:

Occupational exposure limits:

Copper (7440-50-8)		
USA ACGIH	ACGIH TWA (mg/m ³)	1 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1 mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	1 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	No evidence [**Effective** IDLH=2,000mg Cu/m ³]
FRANCE	INRS-ED984 (VME) (mg/m ³)	Not Reported
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0.11 mg/m ³ [ceiling 0.21mg/ m ³]
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.2 mg/ m ³

Iron (7439-89-6)		
USA ACGIH	ACGIH TWA (mg/m ³)	Not Reported
USA OSHA	OSHA PEL (TWA) (mg/m ³)	Not Reported
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	Not Reported
USA IDLH	USA IDLH (mg/m ³)	Not Reported
FRANCE	INRS-ED984 (VME) (mg/m ³)	Not Reported
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	Not Reported
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	Not Reported

Chromium (7440-47-3)		
USA ACGIH	ACGIH TWA (mg/m ³)	0.5mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.5mg/m ³



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 007
 Revision Date: 08/10/2020 Date of Issue: 08/10/2020 | Version: 1.0

USA IDLH	USA IDLH (mg/m ³)	Not Reported [Effective IDLH=500mg/m ³]
FRANCE	INRS-ED984 (VME) (mg/m ³)	2mg/m ³
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	2mg/m ³
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.5mg/m ³

Cobalt (7440-48-4)		
USA ACGIH	ACGIH TWA (mg/m ³)	0.02 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	0.1mg/m ³ (dust and fume)
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.05 mg/m ³ (dust and fume)
USA IDLH	USA IDLH (mg/m ³)	20 mg/m ³ (dust and ume)
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³

Phosphorous (7723-14-0)		
USA ACGIH	ACGIH TWA (mg/m ³)	100 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	0.1 mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.1 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	5 mg/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	Not Reported
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	Not Reported
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³

Silicon (7440-21-3)		
USA ACGIH	ACGIH TWA (mg/m ³)	10 mg/m ³ (total dust)
USA OSHA	OSHA PEL (TWA) (mg/m ³)	15 mg/m ³ (total dust) 5 mg/m ³ (resp. fraction)
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	10mg/m ³ (total dust) 5 mg/m ³ (resp. dust)
USA IDLH	USA IDLH (mg/m ³)	N.D
FRANCE	INRS-ED984 (VME) (mg/m ³)	10 mg/m ³
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	Not Reported
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	10 mg/m ³ (inhalable) 4 mg/m ³ (respirable)

DNEL (Derived No Effect Level):

Copper (7440-50-8)			
Workers	Acute- Systemic Effects	Dermal	273 mg/kg/bw/day
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	1mg/m ³
		Ocular	No hazard identified
	Long-term- Systemic Effects	Dermal	137 mg/kg/bw/day
		Inhalation	No hazard identified
	Long-term- Local Effects	Dermal	No hazard identified
Inhalation		1 mg/m ³	
General Population	Acute- Systemic Effects	Dermal	273 mg/kg/bw/day
		Inhalation	No hazard identified
		Oral	Low hazard [no threshold derived]
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	1mg/m ³
	Long-term- Systemic Effects	Dermal	137 mg/kg/bw/day
		Inhalation	No hazard identified
		Oral	0.041 mg/kg/bw/day
	Long-term- Local Effects	Dermal	No hazard identified



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 007
 Revision Date: 08/10/2020 Date of Issue: 08/10/2020 | Version: 1.0

		Inhalation	1mg/m3	
Iron (7439-89-6)				
Workers	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Local Effects	Dermal	No hazard identified	
		Inhalation	3mg/m ³	
General Population	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Oral	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Oral	0.71 mg/kg bw/day	
	Long-term- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Chromium (7440-47-3)			
	Workers	Acute- Systemic Effects	Dermal	No hazard identified
Inhalation			No hazard identified	
Acute- Local Effects		Dermal	No hazard identified	
		Inhalation	No hazard identified	
Long-term- Systemic Effects		Dermal	No hazard identified	
		Inhalation	No hazard identified	
Long-term- Local Effects		Dermal	No hazard identified	
		Inhalation	0.5mg/m ³	
General Population	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Oral	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Oral	No hazard identified	
	Long-term- Local Effects	Dermal	No hazard identified	
		Inhalation	0.027 mg/m3	

Cobalt (7440-48-4)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	Medium hazard (no threshold derived)
		Inhalation	High hazard (no threshold derived)
		Ocular	Low hazard (no threshold derived)
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Local Effects	Dermal	Medium hazard (no threshold derived)
Inhalation		40 µg/m ³	
General Population	Acute- Systemic Effects	Dermal	No hazard identified



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 007
 Revision Date: 08/10/2020 Date of Issue: 08/10/2020 | Version: 1.0

		Inhalation	No hazard identified	
		Oral	No hazard identified	
	Acute- Local Effects	Dermal	Medium hazard (no threshold derived)	
		Inhalation	High hazard (no threshold derived)	
	Long-term- Systemic Effects	Dermal	Medium hazard (no threshold derived)	
		Inhalation	No hazard identified	
		Oral	29.8 µg/kg bw/day	
	Long-term- Local Effects	Dermal	No hazard identified	
Inhalation		6.3 µg/m ³		
Phosphorous (7723-14-0)				
Workers	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
General Population	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Oral	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Oral	No hazard identified	
	Long-term- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Silicon (7440-21-3)			
	Workers	Acute- Systemic Effects	Dermal	No hazard identified
Inhalation			No hazard identified	
Acute- Local Effects		Dermal	No hazard identified	
		Inhalation	No hazard identified	
Long-term- Systemic Effects		Dermal	No hazard identified	
		Inhalation	No hazard identified	
Long-term- Local Effects		Dermal	No hazard identified	
		Inhalation	No hazard identified	
General Population	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Oral	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Oral	No hazard identified	
	Long-term- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet
Revision Date: 08/10/2020

Vista Metals' SDS Nbr: 007
Date of Issue: 08/10/2020 | Version: 1.0

PNEC (Predicted No Effect Concentration):

Copper (7440-50-8)	
Freshwater	7.8 µg/L
Marine Water	5.2 µg/L
Sewage Treatment	230 mg/L
Terrestrial Organisms	65 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation
Iron (7439-89-6)	
Freshwater	No data; unlikely aquatic toxicity
Marine Water	No data; unlikely aquatic toxicity
Sewage Treatment	No data; unlikely aquatic toxicity
Terrestrial Organisms	The mixture is not classified as toxic or harmful
Predators (secondary poisoning)	Insufficient hazard data available (further info necessary)
Chromium (7440-47-3)	
Freshwater	6.5 µg/L
Marine Water	No data; unlikely aquatic toxicity
Sewage Treatment	No data; unlikely aquatic toxicity
Terrestrial Organisms	21.1 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation
Cobalt (7440-48-4)	
Freshwater	0.62 µg/L
Marine Water	2.36 µg/L
Sewage Treatment	0.37 mg/L
Terrestrial Organisms	10.9 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation
Phosphorous (7723-14-0)	
Freshwater	No hazard identified
Marine Water	No hazard identified
Sewage Treatment	No hazard identified
Terrestrial Organisms	No hazard identified
Predators (secondary poisoning)	No potential for bioaccumulation
Silicon (7440-21-3)	
Freshwater	No data available
Marine Water	No data available
Sewage Treatment	No data available
Terrestrial Organisms	No data available
Predators (secondary poisoning)	No potential for bioaccumulation

8.2 Exposure Controls

Personal Protection measures, such as personal protective equipment:

- Use personal protective equipment that is clean and has been properly maintained.
- Store personal protective equipment in a clean place, away from the work area.
- Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using.
- Ensure that there is adequate ventilation, especially in confined areas.

Eye/Face Protection:

- Avoid contact with eyes.
- Wearing glasses is recommended- especially before handling powders or dust emission in accordance with standard ANSI A87, EN 166

Hand Protection:

- Wear suitable protective gloves in the event of prolonged or repeated skin contact.
- Gloves must be selected according to the application and during use at the workstation.



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 007
Revision Date: 08/10/2020 Date of Issue: 08/10/2020 | Version: 1.0

Page | 9 of 15

- Protective gloves need to be selected according to their suitability for the workstation in question: other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required. Cut-resistant gloves should be in accordance with standard EN 388 & EN 420

Body Protection:

- Avoid skin contact.
- Wear suitable protective clothing.
- Work clothing worn by personnel shall be laundered regularly.
- After contact with the product, all parts of the body that have been soiled must be washed.

Respiratory Protection:

- Avoid breathing dust.
- If the ventilation is insufficient, wear appropriate breathing apparatus.
- When workers are confronted with concentrations that are above occupational exposure limits, they must wear a suitable, approved respiratory protection device.
- Wear a mask that is in accordance to category FFP3 standard EN149.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

General information:

Physical State- Solid

Color- Red to Reddish-Brown

Important health, safety and environmental information:

pH- Not relevant

Boiling Point/Boiling Range- Not relevant

Flash point interval- Not relevant

Vapor Pressure- Not relevant

Density- 8.94 g/cm³ (0.323 lbs/in³)

Water Solubility- Insoluble

Melting Point/Melting Range- L: 1080-1090°C (1976-1995°F) S: 965-1085°C (1769-1985°F)

Self-ignition temperature- Not specified

Decomposition point/decomposition range- Not specified

9.2 Other Information: Do not shake clothing, rags or other items to remove dust. Dust should be removed by washing or HEPA vacuuming.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Massive metal is stable and not reactive under normal conditions of use, storage and transport.

10.2 Chemical Stability

This element/mixture is stable under the recommended handling and storage conditions in section 7.

10.3 Possibility of Hazardous Reactions

No data available

10.4 Conditions to Avoid

Formation of dusts and humidity. Dusts can form an explosive mixture with air.

10.5 Incompatible Materials

Keep away from: Acids & Strong Oxidizing Agents

10.6 Hazardous Decomposition Products

The thermal decomposition (welding, burning, brazing) may release or form metal oxide fumes.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Inhalation: May cause allergy or asthma symptoms or breathing difficulties. Inhalation or ingestion of dust or fumes can cause respiratory system damage in the event of repeated or prolonged exposure. Suspected human carcinogen.



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 007
Revision Date: 08/10/2020 Date of Issue: 08/10/2020 | Version: 1.0

Skin Contact: Repeated or prolonged contact with the mixture may cause removal of natural oil from the skin resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact: Causes serious eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Symptoms related to the physical, chemical and toxicological characteristics: Eye irritation including stinging, tearing, redness, blurred vision and swelling. Difficulty breathing. Dermatitis and rash. If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Acute Toxicity: May cause an allergic skin reaction.

Skin corrosion/irritation: Prolonged contact can cause irritation.

Respiratory Sensitization: May cause breathing difficulty or asthma symptoms.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: Suspected of causing cancer.

Copper (7440-50-8)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Iron (7439-89-6)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Listed
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Chromium (7440-47-3)	
IARC Monographs, Overall Evaluation of Carcinogenicity	3- Not classifiable as to its carcinogenicity to humans
OSHA Specifically Regulated Substances	Not Listed
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Cobalt (7440-48-4)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2B- Possibly carcinogenic to humans
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list
US National Toxicology Program (NTP) Report on Carcinogens	Reasonably anticipated to be a Human Carcinogen

Phosphorous (7723-14-0)	
IARC Monographs, Overall Evaluation of Carcinogenicity	3- Not classifiable as to its carcinogenicity to humans
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Silicon (7440-21-3)	
IARC Monographs, Overall Evaluation of Carcinogenicity	3- Not classifiable as to its carcinogenicity to humans
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 007
Revision Date: 08/10/2020 Date of Issue: 08/10/2020 | Version: 1.0

Reproductive Toxicity: Repeated and prolonged exposure to fumes and dust created in processing this product may cause reproductive effects.

Chronic effects: In massive form, no hazard exists. If physically altered to present slivers, ribbons, dusts or fumes from molten material. May cause cancer. Is suspected of damaging an unborn child. If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

11.2 Information on Toxicological Effects- Ingredient(s)

Copper (7440-50-8)	
LD50 Oral	472 mg/kg bw
LC50 Inhalation	0.73 mg/L

Iron (7439-89-6)	
LD50 Oral	98,600 mg/kg bw
LC50 Inhalation	>0.25mg/L

Chromium (7440-47-3)	
LD50 Oral	>3400 mg/kg bw
LC50 Inhalation	>5.41mg/L

Cobalt (7440-48-4)	
LD50 Oral	550mg/kg bw
LD50 Dermal	>2000 mg/kg bw
LC50 Inhalation	<0.05 mg/L

Phosphorous (7723-14-0)	
LD50 Oral	380 mg/kg/bw
LC50 Inhalation	31.4 ppm

Silicon (7440-21-3)	
LD50 Oral	3.16 g/kg
Other	Eye, skin, respiratory irritant

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Do not flush into water or sewer system. Do not empty into drains. This product contains substances which are hazardous to the environment.

Copper (7440-50-8)	
EC50 Algae	0.0426-0.0535 mg/L (exposure 72h)
LC50 Freshwater Fish	0.15 mg/L (exposure 96h) Oncorhynchus mykiss
LC50 Freshwater Fish	0.8 mg/L (exposure 96h) Cuprinus carpio
EC50 Microorganisms	Not Listed
EC50 Water Flea	0.03 mg/L (exposure 48h) Daphnia magna

Iron (7439-89-6)	
EC50 Microorganisms	>10,000 mg/L (exposure 3h) Activated sludge
LC50 Freshwater Fish	>10,000 mg/L (exposure 96h) Danio rerio
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia Magna

Chromium (7440-47-3)	
EC50 Crustacea	0.024mg/L (exposure 48h) Daphnia
EC50 Water Flea	0.025mg/L (exposure 48h) Daphnia magna



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 007
Revision Date: 08/10/2020 Date of Issue: 08/10/2020 | Version: 1.0

Page | 12 of 15

EC50 Freshwater Fish	0.002-0.003mg/L (exposure 96h) Oncorhynchus mykiss
----------------------	--

Cobalt (7440-48-4)	
EC50 Algae	144ug Co/L (exposure 72h) Pseudokirchneriella supcapita
LC50 Freshwater Fish	1.5mg Co/L (exposure 96h) Oncorhynchus mykiss
LC50 Freshwater Fish	85mg Co/L (exposure 96h) Danio rerio
EC50 Microorganisms	120mg Co/L (exposure 3h) Activated sludge
LC50 Crustacea	0.61mg Co/L (exposure 48h) Ceriodaphnia dubia

Phosphorous (7723-14-0)	
EC50 Algae	18.3mg/L (exposure 72h) Desmodesmus subspicatus
EC50 Water Flea	10.5mg/L (exposure 48h) Daphnia magna
LC50 Freshwater Fish	33.2mg/L (exposure 96h) Danio rerio

Silicon (7440-21-3)	
Insufficient Data	

12.2 Persistence & Degradability: Insoluble in water.

12.3 Bioaccumulation/Accumulation: Not biodegradable.

12.4 Mobility in soil: Nickel in massive form is not mobile in the environment.

12.5: Results of PBT and vPvB Assessment: This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.

12.6 Other adverse effects: Avoid unnecessary release into the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Scrap related to metal processing are recovered materials.

13.1 Waste Treatment Methods:

- Do not pour into drains or waterways. Dispose of in accordance with local regulations.

Waste:

- Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.
- Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector.
- Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

Soiled Packaging:

- Give to a certified disposal contractor.

SECTION 14: TRANSPORTATION INFORMATION

Exempt from transport classification and labeling.

ADR, RID, AND, IATA, IMDG- This product is not covered by international regulations on the transport of dangerous goods.

SECTION 15: REGULATORY INFORMATION

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

Classification and labeling information included in section 2:

The following regulations have been used:

EU Regulation No. 1272/2008 amended by EC 790/2009

Container information:

None available

Usage restrictions apply to the product: See Annex XVII of EC Regulation No. 1907/2006:

For professional users only

Particular provisions:



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 007
Revision Date: 08/10/2020 Date of Issue: 08/10/2020 | Version: 1.0

In accordance with Article 1.3.4 of Annex I of 1272/2008/CE regulations, metals and alloys in massive form do not require a label. Although classified as hazardous according to criteria of the directive, some of these substances are not hazardous for human health by inhalation, ingestion or skin contact, or hazardous to the aquatic environment in the form in which they are placed on the market.

15.2 US Federal Regulations:

Copper/ Copper Alloys	
SARA Section 311/312 Hazard Class	Delayed (chronic) health hazard

Copper (7440-50-8)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	0.1%

Iron (7439-89-6)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	Not Listed

Chromium (7440-47-3)	
CERCLA RQ	5,000 lbs RQ [solid metal particles <100µm diameter (0.004”)]
SARA Section 313- Emission Reporting	Yes

Cobalt (7440-48-4)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	0.1%

Phosphorous (7723-14-0)	
CERCLA RQ	100 lb (only applicable if particles are <100 µm)
SARA Section 313- Emission Reporting	0.1%

Silicon (7440-21-3)	
Listed on the United States TSCA (Toxic Substances Control Act) Inventory	

15.3 US State Regulations:

Copper (7440-50-8)	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

Iron (7439-89-6)	
Not Listed	

Chromium (7440-47-3)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer (Chromium Hexavalent)
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 007
Revision Date: 08/10/2020 Date of Issue: 08/10/2020 | Version: 1.0

Cobalt (7440-48-4)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

Phosphorous (7723-14-0)	
US- Massachusetts- Right To Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania- Right to Know List	

Silicon (7440-21-3)	
US- Massachusetts- Right To Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania- Right to Know List	

SECTION 16: OTHER INFORMATION

Date of Preparation or Latest Revision: 8/10/2020

Other Information:

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on international, national, and community regulations. The mixture must not be used for other uses than those specified in section 1 without having first obtained written handling instructions. It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations. The information in this safety data sheet must be regarded as a description of the safety requirements relating to the mixture and not as a guarantee of the properties thereof.

Vista Metals, Inc believes that the information in this safety data sheet is accurate. However, Vista Metals, Inc makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.

H&P Phrases:

- H228- Flammable solid
- H317- May cause an allergic skin reaction.
- H351- Suspected of causing cancer.
- H372- Causes damage to organs through prolonged or repeated exposure.
- P201- Obtain special instructions before use.
- P202- Do not handle until all safety precautions have been read and understood.
- P260- Do not breathe dust/fume/gas/mist/vapors/spray.
- P261- Avoid breathing dust/fume/gas/mist/vapors/spray
- P264- Wash.... Thoroughly after handling.
- P270- Do not eat, drink or smoke when using this product.
- P272- Contaminated work clothing should not be allowed out of the workplace.
- P280- Wear protective gloves/protective clothing/eye protection/face protection
- P281- Use personal protective equipment as required.
- P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
- P308 & P313- IF exposed or concerned: Get medical advice/attention.
- P314- Get medical advice/attention if you feel unwell.
- P333 & P313- If irritation or rash occurs, get medical advice/attention.
- P362 & P364- Take off contaminated clothing and wash it before use.
- P405- Store locked up.
- P501- Dispose of contents/container in accordance with local/regional/national/international regulations.



Copper, Copper-Chrome, Copper- Nickel Alloys

Safety Data Sheet
Revision Date: 08/10/2020

Vista Metals' SDS Nbr: 007
Date of Issue: 08/10/2020 | Version: 1.0

Page | 15 of 15

Abbreviations:

ACGIH: American Conference of Governmental Industrial Hygienists
ADR: Alternative Dispute Resolution
AGW: Arbeitsplatzgrenzwerte (occupational exposure limits)
CARC 2B: Carcinogenicity category 2B
CARC 3: Carcinogenicity category 3
CERCLA RQ: Comprehensive Environmental Response, Compensation, and Liability Act Requirements
DGR: Danger
EC50: Half maximal effective concentration
GHS07: Exclamation mark
GHS08: Health Hazard
IATA: International Air Transport Association
IARC: International Agency for Research on Cancer
IDLH: Immediately dangerous to life or health
IMDG: International Maritime Dangerous Goods
INRS: Institute National de la Recherche Scientifique
LC50: Concentration of material in feed or water that is lethal for 50% of exposed population
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PBT: Persistent, bioaccumulate and toxic
PEL: Permissible Exposure Limit
RID: Regulations concerning the International Carriage of Dangerous goods by Rail
SARA: The superfund Amendments and Reauthorization Act
SKIN SENS. 1: Skin sensitivity category 1
STOT RE 1: Specific Target Organ Toxicity Repeated Exposure
SVHC: Substance of Very High Concern
TLV: Threshold Limit Value
vPvB: Very persistent, very bioaccumulate
WEL: Workplace Exposure Limits

END

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

1.1 Product Identifier (s)

Product Name: Nickel- Iron Alloys

Chemical Name: Metal Alloy(s)

Chemical Family: Nickel-Iron Alloys

Trade Names/Alloy Designations: **120, 49, 52, 55, 5543, 55FM, 8014, 8014C, 8014L02, 7715, 8015, Fe32Ni, ICN45**

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

Metal Working- Bar, Rod, Wire, Strip & Cut Lengths

Use Descriptor system (REACH):

PC7: Base metals and alloys

1.3 Details of the Supplier of Safety Data Sheet

Company

Vista Metals, Inc

65 Ballou Blvd

Bristol, RI 02809

Phone: 401-253-1772 Fax: 401-253-1806

<https://vismet.com/>

1.4 Emergency Telephone Number

Vista Metals: 401-253-1772

Association/Organization: INRS/ORFILA <http://www.centres-antipoison>

Ph: +33 (0)1 45 42 59 59

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification with EC regulation No. 1272/2008 and its amendments

Skin Sensitivity-1 H317

Carcinogenicity-2 H351

STOT (repeated exposure)-1 H372

This substance does not present a physical hazard. Consult other references for additional products present on site. No known or foreseeable environmental damage under standard conditions of use.

Full text of hazard classes and H-statements: see Section 16.

2.2 Label Elements

In compliance with EC regulation No. 1272/2008 and its amendments

Hazard Pictograms (GHS)



Signal Word (GHS)

: WARNING

Hazard Statements

: H317- May cause an allergic skin reaction.

H351- Suspected of causing cancer.

H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).

Precautionary Statements (Prevention)

: P201- Obtain special instructions before use.

P202- Do not handle until all safety precautions have been read and understood.

P260- Do not breathe dust/fume/gas/mist/vapors/spray.

P261- Avoid breathing dust/fume/gas/mist/vapors/spray

P264- Wash.... Thoroughly after handling.

P270- Do not eat, drink or smoke when using this product.

P272- Contaminated work clothing should not be allowed out of the workplace.

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

P281- Use personal protective equipment as required.

Precautionary Statements (Response)

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

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

P314- Get medical advice/attention if you feel unwell.

P321- Specific treatment (see... on this label)

P333 & P313- If irritation or rash occurs, get medical advice/attention.



Nickel-Iron Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 008
Revision Date: 05/07/2020 Date of Issue: 05/07/2020 | Version: 1.0

P362 & P364- Take off contaminated clothing and wash it before use.

Precautionary Statements (Storage) : P405- Store locked up.

Precautionary Statements (Disposal) : P273- Avoid release to the environment
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other Hazards

- **WARNING!** Exposure to dust or fumes can cause eye, skin, respiratory tract infection and flu-like illness. Inhalation or ingestion of dust or fumes can cause respiratory system damage. May cause an allergic skin reaction, and eye and mucous membrane irritation may occur. Contains materials that may cause cancer and/or nervous system effects. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. **Wash hands thoroughly after handling.**
- Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).
- The mixture does not contain substances classified as "Substances of Very High Concern" (SVHC) $\geq 0.1\%$ published by the European Chemicals Agency (ECHA) under article 57 of REACH: <http://echa.europa.edu/fr/candidate-list-table>
- This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.
- This substance may not require a label according to Article 17 (see section 1.3.3.2 of Annex I).
- Metals in massive form, alloys, mixtures containing polymers, and mixtures containing elastomers, do not require a label according to the provisions of this Annex, if they do not present a hazard to human health by inhalation, ingestion or contact with skin or to the aquatic environment in the form in which they are placed on the market, although classified in accordance with the criteria of this Annex.
- The supplier shall provide the information which shall have appeared on the label to downstream users or distributors in the safety data sheet.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Composition of Component

Name	Product Identifier	%	GHS Classification & EC 1272/2008
Nickel	INDEX: 028-002-00-7 CAS: 7440-02-0 EC: 231-111-4	$48 \leq X < 81$	GHS08 • GHS07 • DGR • CARC. 2, H351 STOT RE 1, H372 • SKIN SENS. 1, H317
Iron	INDEX: --- CAS: 7439-89-6 EC: 231-096-4	$14 \leq X < 50$	Comb. Dust
Molybdenum	INDEX: --- CAS: 7439-98-7 EC: 231-107-2	$0 \leq X < 4$	Comb. Dust

Full text of H-phrases, see Section 16



Nickel-Iron Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 008
Date of Issue: 05/07/2020 | Version: 1.0

3.1.2 Base Metal & Alloying Elements:

Components	CAS Nbr	Exposure Limits			
		ACGIH TLV (mg/m3)		OSHA PEL (mg/m3)	
Iron (Fe)	7439-89-6	5	Oxide Dust / Fume	10	Oxide Dust / Fume
Nickel (Ni)	7440-02-0	1.5	Metal	1	Metal and Insoluble Component
Chromium (Cr)	7440-47-3	0.5	Metals	1	Metal
Aluminum (Al)	7429-90-5	10 5	Dust Fume	15 5	Dust Respirable fraction
Boron (B)	7440-42-8	10	Oxide Dust	15	Oxide Dust
Carbon (C)	7440-44-0	-	Not Established	-	Not Established
Cobalt (Co)	7440-48-4	0.02	As Cobalt (A3 Carcinogen)	0.1	Metal / Dust / Fume
Copper (Cu)	7440-50-8	1 0.2	Dust Fume	1 0.1	Dust Fume
Lead (Pb)	7439-92-1	0.05	Dust/Fume (A3 Carcinogen)	0.05	Dust / Fume
Manganese(Mn)	7439-96-5	0.2	Elemental Mn & Inorganic Compounds	5	Insoluble Compounds
Molybdenum(Mo)	7439-98-7	10	Insoluble Compounds	15	Insoluble Compounds
Niobium (Nb)	7440-03-1	-	Not Established	-	Not Established
Phosphorous(P)	7723-14-0	0.1	Phosphorus	0.1	Phosphorus
Silicon (Si)	7440-21-3	10	Dust	15	Dust
Sulfur (S)	7446-09-05	5.2 13	Sulfur Dioxide Sulfur Dioxide (STEL)	13	Sulfur Dioxide
Titanium (Ti)	7440-32-6	-	Not Established	-	Not Established
Tungsten (W)	7440-33-7	5	Insoluble Compounds as W Insoluble Compounds as W (STEL)	-	Not Established
Vanadium (V)	7440-62-2	0.05	Oxide Dust / Fume	0.5 0.1	Oxide Dust (Ceiling) Oxide Fume (Ceiling)
Zinc (Zn)	7440-66-6	10 5 10	Oxide Dust Oxide Fume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measure:

General: As a general rule, in case of any doubt or if symptoms persist, always call a doctor.

NEVER induce swallowing by an unconscious person.

Inhalation: If inhaled, remove to fresh air and keep at rest in a comfortable breathing position. Get immediate medical attention if breathing difficulty persists or if person has stopped breathing.

Skin Contact: Remove contaminated clothing and wash skin with water and soap or recognized cleaner. Wash contaminated clothing before reuse. Watch out for any remaining product in skin, clothing, shoes, watches, etc. In the event of an allergic reaction, seek medical attention. If the contaminated area is widespread or there is damage to the skin, a doctor must be consulted or the patient transferred to hospital.

Eye Contact: Immediately rinse with water [eyes open] for at least 15 minutes. Remove contact lenses if present and easy to do- continue rinsing. If there is any redness, pain or visual impairment, obtain medical attention.

Ingestion: If swallowed, seek medical attention immediately and bring label or this safety sheet.

4.2 Most important symptoms and effects, both acute and delayed

General: Skin sensitization. May cause cancer. Under normal condition of use, this material is not anticipated to present a significant hazard. If metal dust is produced, it can cause irritation of the skin and respiratory tract and can be harmful.

Inhalation: If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Skin contact: Dust can get stuck in skin folds or by contact with tight clothing.

Eye Contact: Dust that is generated can get stuck in eye, along with slivers as well. Fumes, dust and slivers will most likely cause eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Chronic Symptoms: Nickel compounds and Metallic nickel may cause cancer. Is suspected of damaging an unborn child. Extended exposure to excessive concentrations of metal fumes and dusts can be associated in permanent changes in the lung function and pulmonary diseases.

- Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds



Nickel-Iron Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 008
Date of Issue: 05/07/2020 | Version: 1.0

Page | 4 of 12

are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).

4.3 Indication of any immediate medical attention and special treatment needed

In case of injury, make sure the person is up to date with anti-tetanus vaccine. If medical advice is necessary, bring label or safety sheet with you.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media: Non-flammable in massive form. Only dust generated by the processing of metal may be flammable. Do not use water when molten material is involved. The combination of hot product and water will result in an extreme explosion.

5.2 Special hazards arising from the substance or mixture: A fire will often produce a thick, black smoke. Exposure to decomposition byproducts may be hazardous to health. Do not breathe in smoke. Fumes may cause metal fumes fever. **DO NOT use water on molten metal: an explosion hazard could result. DO NOT BREATHE IN SMOKE!**

5.3 Advice for firefighters: Use self-contained breathing apparatus (NIOSH-approved) and full protective clothing must be worn in case of fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, protective equipment & emergency procedures:

- Consult the safety measures listed under sections 7 & 8.
- For non fire-fighters: Avoid any contact with the skin and eyes.
- For fire-fighters: Be equipped with suitable personal protective equipment (see section 8).

6.2 Environmental precautions:

- Prevent any material from entering drains or waterways.

6.3 Methods and material for containment and cleaning up:

- Retrieve the product by mechanical means [sweeping/vacuuming].
- Stop the flow of material if you are without risk.

6.4 Reference to other sections:

- For safety measures and personal protection, see sections 7 & 8.

SECTION 7: HANDLING AND STORAGE

Requirements relating to storage remises apply to all facilities where the mixture is handled.

Individuals with a history of skin sensitization should not, under any circumstances, handle this mixture.

7.1 Precautions for safe handling:

- Always wash hands after handling.
- The appropriate industrial and environmental safety measures must be taken for processing steps which cause dust (see also section 8).
- Ensure proper ventilation/exhaustion at the workplace.
- Take note of emission threshold.
- Remove and wash contaminated clothing before re-using.

Fire Prevention:

- Prevent access by unauthorized personnel.

Recommended equipment and procedures:

- For personal protection, see section 8.

Prohibited equipment and procedures:

- No smoking, eating or drinking in areas where the mixture is used.

7.2 Conditions for safe storage, including any incompatibilities:

- Store in dry and ventilated area.
- Do not store in a corrosive environment to avoid alloy's oxidation.
- Packaging: Always keep in packaging made of an identical material to the original.

7.3 Specific end use(s): No data available



Nickel-Iron Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 008
Date of Issue: 05/07/2020 | Version: 1.0

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters:

Occupational exposure limits:

Nickel (7440-02-0)		
USA ACGIH	ACGIH TWA (mg/m ³)	1.5 mg/m ³ – as inhalable fraction
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.015 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	10mg Ni/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³
Iron (7439-89-6)		
USA ACGIH	ACGIH TWA (mg/m ³)	Not Reported
USA OSHA	OSHA PEL (TWA) (mg/m ³)	Not Reported
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	Not Reported
USA IDLH	USA IDLH (mg/m ³)	Not Reported
FRANCE	INRS-ED984 (VME) (mg/m ³)	Not Reported
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	Not Reported
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	Not Reported
Molybdenum (7439-98-7)		
USA ACGIH	ACGIH TWA (mg/m ³)	10mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	15mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	No Established RELs
USA IDLH	USA IDLH (mg/m ³)	5,000mg Mo/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	5mg/m ³
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	Not Reported
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	5mg/ m ³

DNEL (Derived No Effect Level):

Nickel (7440-02-0)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	11.9 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.05mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.05mg Ni/m ³
General Population	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	0.37 mg Ni ion/kgbw/day
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	0.8 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.00006mg Ni/m ³
		Oral	0.011mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.00006mg Ni/m ³



Nickel-Iron Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 008
Date of Issue: 05/07/2020 | Version: 1.0

Iron (7439-89-6)				
Workers	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Local Effects	Dermal	No hazard identified	
		Inhalation	3mg/m ³	
General Population	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Oral	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Oral	0.71 mg/kg bw/day	
	Long-term- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Molybdenum (7439-98-7)			
	Workers	Acute- Systemic Effects	Dermal	No hazard identified
Inhalation			No hazard identified	
Acute- Local Effects		Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Ocular	No hazard identified	
Long-term- Systemic Effects		Dermal	No hazard identified	
		Inhalation	11.7 mg/ m ³	
Long-term- Local Effects		Dermal	No hazard identified	
	Inhalation	No hazard identified		
General Population	Acute- Systemic Effects	Dermal	No threshold effect	
		Inhalation	No hazard identified	
		Oral	Exposure based waiving	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	3.33mg/ m ³	
		Oral	3.4 mg/kg bw/day	
	Long-term- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	

PNEC (Predicted No Effect Concentration):

Nickel (7440-02-0)	
Freshwater	7.1 µg/L
Marine Water	8.6 µg/L
Sewage Treatment	0.33 µg/L
Terrestrial Organisms	29.9 mg/kg soil dw
Predators (secondary poisoning)	0.12 mg/kg food

Iron (7439-89-6)	
Freshwater	No data; unlikely aquatic toxicity



Nickel-Iron Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 008
Date of Issue: 05/07/2020 | Version: 1.0

Marine Water	No data; unlikely aquatic toxicity
Sewage Treatment	No data; unlikely aquatic toxicity
Terrestrial Organisms	The mixture is not classified as toxic or harmful
Predators (secondary poisoning)	Insufficient hazard data available (further info necessary)

Molybdenum (7439-98-7)	
Freshwater	12.7 mg/L
Marine Water	2.28 mg/L
Sewage Treatment	21.7 mg/L
Terrestrial Organisms	9.9 mg/kg soil dw
Predators (secondary poisoning)	Not Listed

8.2 Exposure Controls

Personal Protection measures, such as personal protective equipment:

- Use personal protective equipment that is clean and has been properly maintained.
- Store personal protective equipment in a clean place, away from the work area.
- Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using.
- Ensure that there is adequate ventilation, especially in confined areas.

Eye/Face Protection:

- Avoid contact with eyes.
- Wearing glasses is recommended- especially before handling powders or dust emission in accordance with standard ANSI A87, EN 166

Hand Protection:

- Wear suitable protective gloves in the event of prolonged or repeated skin contact.
- Gloves must be selected according to the application and during use at the workstation.
- Use gloves that are resistant to chemical agents in accordance to standard EN ISO 374.
- Protective gloves need to be selected according to their suitability for the workstation in question: other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required. Cut-resistant gloves should be in accordance with standard EN 388 & EN 420

Body Protection:

- Avoid skin contact.
- Wear suitable protective clothing.
- Work clothing work by personnel shall be laundered regularly.
- After contact with the product, all parts of the body that have been soiled must be washed.

Respiratory Protection:

- Avoid breathing dust.
- If the ventilation is insufficient, wear appropriate breathing apparatus.
- Time limits for wearing must be observed.
- When workers are confronted with concentrations that are above occupational exposure limits, they must wear a suitable, approved respiratory protection device.
- Wear a mask that is in accordance to category FFP3 standard EN149.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

General information:

Physical State- Solid

Color- Light metallic gray to silver-gray

Important health, safety and environmental information:

pH- not relevant

Boiling Point/Boiling Range- Not specified

Flash point interval- Not relevant

Vapor Pressure- Not relevant

Density- 8.7 g/cm³ (0.3143 lbs/in³)



Nickel-Iron Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 008
Date of Issue: 05/07/2020 | Version: 1.0

Water Solubility- Insoluble

Melting Point/Melting Range- 1400- 1500°C (2552- 2732°F)

Self-ignition temperature- Not specified

Decomposition point/decomposition range- Not specified

9.2 Other Information: No data available.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Massive metal is stable and not reactive under normal conditions of use, storage and transport.

10.2 Chemical Stability

This element/mixture is stable under the recommended handling and storage conditions in section 7.

10.3 Possibility of Hazardous Reactions

Hydrogen is released in contact with acid which can cause explosive gas mixtures.

10.4 Conditions to Avoid

Formation of dusts and humidity.

10.5 Incompatible Materials

Keep away from: Acids & Strong Oxidizing Agents

10.6 Hazardous Decomposition Products

The thermal decomposition (welding, burning, brazing) may release or form metal oxide fumes.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Inhalation: May cause allergy or asthma symptoms or breathing difficulties. Inhalation or ingestion of dust or fumes can cause respiratory system damage in the event of repeated or prolonged exposure. Suspected human carcinogen.

Skin Contact: Repeated or prolonged contact with the mixture may cause removal of natural oil from the skin resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact: Causes serious eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Symptoms related to the physical, chemical and toxicological characteristics: Eye irritation including stinging, tearing, redness, blurred vision and swelling. Difficulty breathing. Dermatitis and rash. If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Acute Toxicity: May cause an allergic skin reaction.

Skin corrosion/irritation: Prolonged contact can cause irritation.

Respiratory Sensitization: May cause breathing difficulty or asthma symptoms.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: Suspected of causing cancer.

Nickel (7440-02-0)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2- Suspected human carcinogen
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen List
US National Toxicology Program (NTP) Report on Carcinogens	Known to be a Human Carcinogen Reasonably anticipated to be a Human Carcinogen

Iron (7439-89-6)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Listed
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed



Nickel-Iron Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 008
Date of Issue: 05/07/2020 | Version: 1.0

Molybdenum (7439-98-7)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Reproductive Toxicity: Repeated and prolonged exposure to fumes and dust created in processing this product may cause reproductive effects.
Chronic effects: May cause cancer. Is suspected of damaging an unborn child. Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation.

11.2 Information on Toxicological Effects- Ingredient(s)

Nickel (7440-02-0)	
LD50 Oral	>9000 mg/kg/bw
LC50 Inhalation	>10.2mg/L

Iron (7439-89-6)	
LD50 Oral	98,600 mg/kg bw
LC50 Inhalation	>0.25mg/L

Molybdenum (7439-98-7)	
LD50 Oral	>6,000 mg/kg bw
LC50 Inhalation	>2.82 mg/L/ 4 hr

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Do not flush into water or sewer system. Do not empty into drains. This product contains substances which are hazardous to the environment.

Nickel (7440-02-0)	
EC50 Freshwater Algae	0.174 - 0.311 mg/L (exposure 96h) Pseudokirchneriella subcapitata
EC50 Freshwater Algae	=0.18 mg/L (exposure 72h) Pseudokirchneriella subcapitata
LC50 Freshwater Fish	= 10.4mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	= 1.3mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	>100mg/L (exposure 96h) Brachydanio rerio
EC50 Water Flea	=1mg/L (exposure 48h) Daphnia magna
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia magna

Iron (7439-89-6)	
EC50 Microorganisms	>10,000 mg/L (exposure 3h) Activated sludge
LC50 Freshwater Fish	>10,000 mg/L (exposure 96h) Danio rerio
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia Magna

Molybdenum (7439-98-7)	
EC50 Algae	362.9 mg/L (exposure 72h) Pseudokirchnerella subcapitata
LC50 Freshwater Fish	644.2 mg/L (exposure 96h) Pimephales promelas
EC50 Microorganisms	820 mg/L (exposure 3h) Activated sludge
LC50 Water Flea	>1,727.8 mg/L (exposure 48h) Daphnia magna
LC50 Crustacea	1,015 mg/L (exposure 48h) Ceriodaphnia dubia



Nickel-Iron Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 008
Date of Issue: 05/07/2020 | Version: 1.0

12.2 Persistence & Degradability: Insoluble in water.

12.3 Bioaccumulation/Accumulation: Not biodegradable.

12.4 Mobility in soil: Nickel in massive form is not mobile in the environment.

12.5: Results of PBT and vPvB Assessment: This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.

12.6 Other adverse effects: Avoid unnecessary release into the environment. Alloys in solid form do not pose an ecological threat.

SECTION 13: DISPOSAL CONSIDERATIONS

Scrap related to metal processing are recovered materials.

13.1 Waste Treatment Methods:

- Do not pour into drains or waterways. Dispose of in accordance with local regulations.

Waste:

- Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.
- Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector.
- Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

Soiled Packaging:

- Give to a certified disposal contractor.

SECTION 14: TRANSPORTATION INFORMATION

Exempt from transport classification and labeling.

ADR, RID, AND, IATA, IMDG- This product is not covered by international regulations on the transport of dangerous goods.

SECTION 15: REGULATORY INFORMATION

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

Classification and labeling information included in section 2:

The following regulations have been used:

EU Regulation No. 1272/2008 amended by EU Regulation No. 2018/1480 (ATP 13)

Regulation (EC) No 1907/2006 Annex XVII Conditions of restriction: 27

Container information:

None available

Usage restrictions apply to the product: See Annex XVII of EC Regulation No. 1907/2006:

For professional users only

Particular provisions:

In accordance with Article 1.3.4 of Annex I of 1272/2008/CE regulations, metals and alloys in massive form do not require a label. Although classified as hazardous according to criteria of the directive, some of these substances are not hazardous for human health by inhalation, ingestion or skin contact, or hazardous to the aquatic environment in the form in which they are placed on the market.

15.2 US Federal Regulations:

Nickel- Iron Alloy	
SARA Section 311/312 Hazard Classes	Acute & Delayed Health Hazard

Nickel (7440-02-0)	
Listed on the United States TSCA (Toxic Substances Control Act) Inventory- subject to reporting requirements of US SARA Section 313	
CERCLA RQ	100 lb (only applicable if particles are <100µm)
SARA Section 313- Emission Reporting	0.1%

Molybdenum (7439-98-7)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	Not Listed



Nickel-Iron Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 008
Date of Issue: 05/07/2020 | Version: 1.0

15.3 US State Regulations:

Nickel (7440-02-0)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

Iron (7439-89-6)	
Not Listed	

Molybdenum (7439-98-7)	
US- Massachusetts-Right to Know List	
UA-New Jersey- Right to Know List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	

SECTION 16: OTHER INFORMATION

Date of Preparation or Latest Revision: 05/07/2020

Other Information:

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on international, national, and community regulations. The mixture must not be used for other uses than those specified in section 1 without having first obtained written handling instructions. It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations. The information in this safety data sheet must be regarded as a description of the safety requirements relating to the mixture and not as a guarantee of the properties thereof.

Vista Metals, Inc believes that the information in this safety data sheet is accurate. However, Vista Metals, Inc makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.

H&P Phrases:

- H317- May cause an allergic skin reaction.
- H351- Suspected of causing cancer.
- H372- Causes damage to organs through prolonged or repeated exposure.
- H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).
- P201- Obtain special instructions before use.
- P202- Do not handle until all safety precautions have been read and understood.
- P260- Do not breathe dust/fume/gas/mist/vapors/spray.
- P261- Avoid breathing dust/fume/gas/mist/vapors/spray.
- P264- Wash.... Thoroughly after handling.
- P270- Do not eat, drink or smoke when using this product.
- P272- Contaminated work clothing should not be allowed out of the workplace.
- P280- Wear protective gloves/protective clothing/eye protection/face protection
- P281- Use personal protective equipment as required.
- P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
- P308 & P313- IF exposed or concerned: Get medical advice/attention.
- P314- Get medical advice/attention if you feel unwell.
- P321- Specific treatment (see... on this label)
- P333 & P313- If irritation or rash occurs, get medical advice/attention.
- P362 & P364- Take off contaminated clothing and wash it before use.
- P405- Store locked up.
- P273- Avoid release to the environment
- P501- Dispose of contents/container in accordance with local/regional/national/international regulations.



Nickel-Iron Alloys

Safety Data Sheet
Revision Date: 05/07/2020

Vista Metals' SDS Nbr: 008
Date of Issue: 05/07/2020 | Version: 1.0

Abbreviations:

ACGIH: American Conference of Governmental Industrial Hygienists
ADR: Alternative Dispute Resolution
AGW: Arbeitsplatzgrenzwerte (occupational exposure limits)
CARC 2: Carcinogenicity category 2
CERCLA RQ: Comprehensive Environmental Response, Compensation, and Liability Act Requirements
DGR: Danger
EC50: Half maximal effective concentration
GHS07: Exclamation mark
GHS08: Health Hazard
IATA: International Air Transport Association
IARC: International Agency for Research on Cancer
IDLH: Immediately dangerous to life or health
IMDG: International Maritime Dangerous Goods
INRS: Institut National de la Recherche Scientifique
LC50: Concentration of material in feed or water that is lethal for 50% of exposed population
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PBT: Persistent, bioaccumulate and toxic
PEL: Permissible Exposure Limit
RID: Regulations concerning the International Carriage of Dangerous goods by Rail
SARA: The superfund Amendments and Reauthorization Act
SKIN SENS. 1: Skin sensitivity category 1
STOT RE 1: Specific Target Organ Toxicity Repeated Exposure
SVHC: Substance of Very High Concern
TLV: Threshold Limit Value
vPvB: Very persistent, very bioaccumulate
WEL: Workplace Exposure Limits

END

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

1.1 Product Identifier (s)

Product Name: Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Chemical Name: Metal Alloy(s)

Chemical Family: Cobalt, Iron-Cobalt and Cobalt-Iron Alloys

Synonyms: Soft Magnetic or Magnetic Irons

Trade Names/Alloy Designations: **4948 (Vacodur S+), 4949 (Vacodur-Type 1), 4950 (Vacodur), 50 (Vacoflux 50), 955 (Cobalt-Iron), 9551 (CoFe5Ni1), 9553 (CoFeNi4), 1700 (Vacoflux 17)**

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

Metal Working- Bar, Rod, Wire & Strip.

Use Descriptor system (REACH):

PC7: Base metals and alloys

1.3 Details of the Supplier of Safety Data Sheet

Company

Vista Metals, Inc

65 Ballou Blvd

Bristol, RI 02809

Phone: 401-253-1772 Fax: 401-253-1806

<https://vismet.com/>

1.4 Emergency Telephone Number

Vista Metals: 401-253-1772

Association/Organization: INRS/ORFILA <http://www.centres-antipoison>

Ph: +33 (0)1 45 42 59 59

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification with EC regulation No. 1272/2008 and its amendments

Skin Sensitivity-1 H317

Carcinogenicity-2 H351

STOT (repeated exposure)-1 H372

Acute Toxicity (Oral)- 4 H302

This substance does not present a physical hazard. Consult other references for additional products present on site. No known or foreseeable environmental damage under standard conditions of use.

Full text of hazard classes and H-statements: see Section 16.

2.2 Label Elements

In compliance with EC regulation No. 1272/2008 and its amendments

Hazard Pictograms (GHS)



Signal Word (GHS)

: 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.
H372- Causes damage to organs through prolonged or repeated exposure.
H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).

**Precautionary Statements
(Prevention)**

: P201- Obtain special instructions before use.
P202- Do not handle until all safety precautions have been read and understood.
P260- Do not breathe dust/fume/gas/mist/vapors/spray.
P264- Wash.... Thoroughly after handling.
P270- Do not eat, drink or smoke when using this product.
P272- Contaminated work clothing should not be allowed out of the workplace.
P280- Wear protective gloves/protective clothing/eye protection/face protection
P281- Use personal protective equipment as required.



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 009
Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 1.0

Precautionary Statements (Response) : P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
P308 & P313- IF exposed or concerned: Get medical advice/attention.
P314- Get medical advice/attention if you feel unwell.
P333 & P313- If irritation or rash occurs, get medical advice/attention.
P362 & P364- Take off contaminated clothing and wash it before use.

Precautionary Statements (Storage) : P405- Store locked up.

Precautionary Statements (Disposal) : P273- Avoid release to the environment
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other Hazards

- **WARNING!** Exposure to dust or fumes can cause eye, skin, respiratory tract infection and flu-like illness. Inhalation or ingestion of dust or fumes can cause respiratory system damage. May cause an allergic skin reaction, and eye and mucous membrane irritation may occur. Contains materials that may cause cancer and/or nervous system effects. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. **Wash hands thoroughly after handling.**
- Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).
- Cobalt and Cobalt Compounds are listed in the Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP). Cobalt compounds are **reasonably anticipated to be a known carcinogen** (2016). Cobalt and Cobalt Compounds are also listed in the Monograph Series of the International Agency for Research on Cancer (IARC). According to IARC, cobalt is classified as Group 2B and therefore **possibly carcinogenic** to humans.
- The mixture does not contain substances classified as "Substances of Very High Concern" (SVHC) $\geq 0.1\%$ published by the European Chemicals Agency (ECHA) under article 57 of REACH: <http://echa.europa.edu/fr/candidate-list-table>
- This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.
- This substance may not require a label according to Article 17 (see section 1.3.3.2 of Annex I).
- Metals in massive form, alloys, mixtures containing polymers, and mixtures containing elastomers, do not require a label according to the provisions of this Annex, if they do not present a hazard to human health by inhalation, ingestion or contact with skin or to the aquatic environment in the form in which they are placed on the market, although classified in accordance with the criteria of this Annex.
- The supplier shall provide the information which shall have appeared on the label to downstream users or distributors in the safety data sheet.
- For alloys with a content of $<1.0\%$ Cobalt eliminates the classification with R42 bzw. H334.
- Hazards not otherwise classified (HNOC) Harmful to aquatic organisms.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Composition of Component

Name	Product Identifier	%	GHS Classification & EC 1272/2008
Cobalt	INDEX: 027-001-00-9 CAS: 7440-48-4 EC: 231-158-0	$17 \geq X < 95$	GHS08 • GHS07 • DGR • CARC. 2B, H351 STOT RE 1, H372 • SKIN SENS. 1, H317 ACUTE TOX. (ORAL) 4, H302
Iron	INDEX: --- CAS: 7439-89-6 EC: 231-096-4	$5.5 \leq X < 80$	Comb. Dust
Chromium Non-Hexavalent	INDEX: --- CAS: 7440-47-3 EC: 231-157-5	$X < 2.1$	GHS08 • GHS07 • DGR • CARC. 3, H351 STOT RE 1, H372 • SKIN SENS. 1, H317 ACUTE TOX. (ORAL) 4, H302



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 009
Date of Issue: 07/20/2020 | Version: 1.0

Nickel	INDEX: 028-002-00-7 CAS: 7440-02-0 EC: 231-111-4	X < 1	GHS08 • GHS07 • DGR • CARC. 2, H351 STOT RE 1, H372 • SKIN SENS. 1, H317 ACUTE TOX. (ORAL) 2, H300
Vanadium	INDEX: --- CAS: 7440-62-2 EC: 231-171-1	X < 2.1	SUBSTANCE WITH A COMMUNITY WORKPLACE EXPOSURE LIMIT

Full text of H-phrases, see Section 16

3.1.2 Base Metal & Alloying Elements:

Components	CAS Nbr	Exposure Limits			
		ACGIH TLV (mg/m3)		OSHA PEL (mg/m3)	
Iron (Fe)	7439-89-6	5	Oxide Dust / Fume	10	Oxide Dust / Fume
Nickel (Ni)	7440-02-0	1.5	Metal	1	Metal and Insoluble Component
Chromium (Cr)	7440-47-3	0.5	Metals	1	Metal
Aluminum (Al)	7429-90-5	10 5	Dust Fume	15 5	Dust Respirable fraction
Boron (B)	7440-42-8	10	Oxide Dust	15	Oxide Dust
Carbon (C)	7440-44-0	-	Not Established	-	Not Established
Cobalt (Co)	7440-48-4	0.02	As Cobalt (A3 Carcinogen)	0.1	Metal / Dust / Fume
Copper (Cu)	7440-50-8	1 0.2	Dust Fume	1 0.1	Dust Fume
Lead (Pb)	7439-92-1	0.05	Dust/Fume (A3 Carcinogen)	0.05	Dust / Fume
Manganese(Mn)	7439-96-5	0.2	Elemental Mn & Inorganic Compounds	5	Insoluble Compounds
Molybdenum(Mo)	7439-98-7	10	Insoluble Compounds	15	Insoluble Compounds
Niobium (Nb)	7440-03-1	-	Not Established	-	Not Established
Phosphorous(P)	7723-14-0	0.1	Phosphorus	0.1	Phosphorus
Silicon (Si)	7440-21-3	10	Dust	15	Dust
Sulfur (S)	7446-09-05	5.2 13	Sulfur Dioxide Sulfur Dioxide (STEL)	13	Sulfur Dioxide
Titanium (Ti)	7440-32-6	-	Not Established	-	Not Established
Tungsten (W)	7440-33-7	5	Insoluble Compounds as W Insoluble Compounds as W (STEL)	-	Not Established
Vanadium (V)	7440-62-2	0.05	Oxide Dust / Fume	0.5 0.1	Oxide Dust (Ceiling) Oxide Fume (Ceiling)
Zinc (Zn)	7440-66-6	10 5 10	Oxide Dust Oxide Fume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measure:

General: As a general rule, in case of any doubt or if symptoms persist, always call a doctor.

NEVER induce swallowing by an unconscious person.

Inhalation: If inhaled, remove to fresh air and keep at rest in a comfortable breathing position. Get immediate medical attention if breathing difficulty persists or if person has stopped breathing.

Skin Contact: Remove contaminated clothing and wash skin with water and soap or recognized cleaner. Wash contaminated clothing before reuse. Watch out for any remaining product in skin, clothing, shoes, watches, etc. In the event of an allergic reaction, seek medical attention. If the contaminated area is widespread or there is damage to the skin, a doctor must be consulted or the patient transferred to hospital.

Eye Contact: Immediately rinse with water [eyes open] for at least 15 minutes. Remove contact lenses if present and easy to do- continue rinsing. If there is any redness, pain or visual impairment, obtain medical attention.

Ingestion: If swallowed, seek medical attention immediately and bring label or this safety sheet.

4.2 Most important symptoms and effects, both acute and delayed

General: Skin sensitization. May cause cancer. Is suspected of damaging an unborn child. Under normal condition of use, this material is not anticipated to present a significant hazard. If metal dust is produced, it can cause irritation of the skin and respiratory tract and can be harmful.



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 009
Date of Issue: 07/20/2020 | Version: 1.0

Page | 4 of 15

Inhalation: If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Skin contact: Dust can get stuck in skin folds or by contact with tight clothing.

Eye Contact: Dust that is generated can get stuck in eye, along with slivers as well. Fumes, dust and slivers will most likely cause eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Chronic Symptoms: May cause cancer. Is suspected of damaging an unborn child. Extended exposure to excessive concentrations of metal fumes and dusts can be associated in permanent changes in the lung function and pulmonary diseases.

- Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).
- Cobalt and Cobalt Compounds are listed in the Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP). Cobalt compounds are **reasonably anticipated to be a human carcinogen** (2016). Cobalt and Cobalt Compounds are also listed in the Monograph Series of the International Agency for Research on Cancer (IARC). According to IARC, cobalt is classified as Group 2B and therefore **possibly carcinogenic** to humans.

4.3 Indication of any immediate medical attention and special treatment needed

In case of injury, make sure the person is up to date with anti-tetanus vaccine. If medical advice is necessary, bring label or safety sheet with you.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media: Non-flammable in massive form. Only dust generated by the processing of metal may be flammable. Do not use water when molten material is involved. The combination of hot product and water will result in an extreme explosion.

5.2 Special hazards arising from the substance or mixture: A fire will often produce a thick, black smoke. Exposure to decomposition byproducts may be hazardous to health. **DO NOT use water on molten metal: an explosion hazard could result. DO NOT BREATHE IN SMOKE!**

5.3 Advice for firefighters: Use self-contained breathing apparatus (NIOSH-approved) and full protective clothing must be worn in case of fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, protective equipment & emergency procedures:

- Consult the safety measures listed under sections 7 & 8.
- For non fire-fighters: Avoid any contact with the skin and eyes.
- For fire-fighters: Be equipped with suitable personal protective equipment (see section 8).

6.2 Environmental precautions:

- Prevent any material from entering drains or waterways.

6.3 Methods and material for containment and cleaning up:

- Retrieve the product by mechanical means [sweeping/vacuuming].
- Stop the flow of material if you are without risk.

6.4 Reference to other sections:

- For safety measures and personal protection, see sections 7 & 8.

SECTION 7: HANDLING AND STORAGE

Requirements relating to storage remises apply to all facilities where the mixture is handled.

Individuals with a history of skin sensitization should not, under any circumstances, handle this mixture.

7.1 Precautions for safe handling:

- Always wash hands after handling.
- Remove and wash contaminated clothing before re-using.

Fire Prevention:

- Prevent access by unauthorized personnel.

Recommended equipment and procedures:

- For personal protection, see section 8.



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 009
 Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 1.0

Prohibited equipment and procedures:

- No smoking, eating or drinking in areas where the mixture is used.

7.2 Conditions for safe storage, including any incompatibilities:

- Store in dry and ventilated area.
- Do not store in a corrosive environment to avoid alloy's oxidation.
- Packaging: Always keep in packaging made of an identical material to the original.

7.3 Specific end use(s): No data available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters:

Occupational exposure limits:

Cobalt (7440-48-4)		
USA ACGIH	ACGIH TWA (mg/m ³)	0.02 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	0.1mg/m ³ (dust and fume)
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.05 mg/m ³ (dust and fume)
USA IDLH	USA IDLH (mg/m ³)	20 mg/m ³ (dust and ume)
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³
Iron (7439-89-6)		
USA ACGIH	ACGIH TWA (mg/m ³)	Not Reported
USA OSHA	OSHA PEL (TWA) (mg/m ³)	Not Reported
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	Not Reported
USA IDLH	USA IDLH (mg/m ³)	Not Reported
FRANCE	INRS-ED984 (VME) (mg/m ³)	Not Reported
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	Not Reported
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	Not Reported
Chromium (7440-47-3)		
USA ACGIH	ACGIH TWA (mg/m ³)	0.5mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.5mg/m ³
USA IDLH	USA IDLH (mg/m ³)	Not Reported [Effective IDLH=500mg/m ³]
FRANCE	INRS-ED984 (VME) (mg/m ³)	2mg/m ³
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	2mg/m ³
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.5mg/m ³
Nickel (7440-02-0)		
USA ACGIH	ACGIH TWA (mg/m ³)	1.5 mg/m ³ – as inhalable fraction
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.015 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	10mg Ni/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³
Vanadium (7440-62-2)		
USA ACGIH	ACGIH TWA (mg/m ³)	Not Reported
USA OSHA	OSHA PEL (TWA) (mg/m ³)	0.5mg/m ³ dust – 0.1mg/m ³ fume
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.5mg/m ³
USA IDLH	USA IDLH (mg/m ³)	35mg/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	0.05mg/m ³
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0.005mg/m ³
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.05mg/m ³



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 009
Date of Issue: 07/20/2020 | Version: 1.0

DNEL (Derived No Effect Level):

Cobalt (7440-48-4)				
Workers	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Acute- Local Effects	Dermal	Medium hazard (no threshold derived)	
		Inhalation	High hazard (no threshold derived)	
		Ocular	Low hazard (no threshold derived)	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Local Effects	Dermal	Medium hazard (no threshold derived)	
		Inhalation	40 µg/m ³	
	General Population	Acute- Systemic Effects	Dermal	No hazard identified
Inhalation			No hazard identified	
Oral			No hazard identified	
Acute- Local Effects		Dermal	Medium hazard (no threshold derived)	
		Inhalation	High hazard (no threshold derived)	
Long-term- Systemic Effects		Dermal	Medium hazard (no threshold derived)	
		Inhalation	No hazard identified	
		Oral	29.8 µg/kg bw/day	
Long-term- Local Effects		Dermal	No hazard identified	
		Inhalation	6.3 µg/m ³	
Iron (7439-89-6)				
Workers		Acute- Systemic Effects	Dermal	No hazard identified
			Inhalation	No hazard identified
		Acute- Local Effects	Dermal	No hazard identified
	Inhalation		No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Local Effects	Dermal	No hazard identified	
		Inhalation	3mg/m ³	
	General Population	Acute- Systemic Effects	Dermal	No hazard identified
			Inhalation	No hazard identified
Oral			No hazard identified	
Acute- Local Effects		Dermal	No hazard identified	
		Inhalation	No hazard identified	
Long-term- Systemic Effects		Dermal	No hazard identified	
		Inhalation	No hazard identified	
		Oral	0.71 mg/kg bw/day	
Long-term- Local Effects		Dermal	No hazard identified	
		Inhalation	No hazard identified	
Chromium (7440-47-3)				
Workers	Acute- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Acute- Local Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Systemic Effects	Dermal	No hazard identified	
		Inhalation	No hazard identified	
	Long-term- Local Effects	Dermal	No hazard identified	
		Inhalation	0.5mg/m ³	
	General Population	Acute- Systemic Effects	Dermal	No hazard identified
			Inhalation	No hazard identified



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 009
 Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 1.0

		Oral	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	No hazard identified
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	0.027 mg/m ³

Nickel (7440-02-0)

Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	11.9 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.05mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.05mg Ni/m ³
General Population	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	0.37 mg Ni ion/kgbw/day
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	0.8 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.00006mg Ni/m ³
		Oral	0.011mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.00006mg Ni/m ³

Vanadium (7440-62-2)

Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	13 098mg/m ³
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
General Population	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	6 460mg/m ³
		Oral	780mg/kg bw/day
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 009
Date of Issue: 07/20/2020 | Version: 1.0

PNEC (Predicted No Effect Concentration):

Cobalt (7440-48-4)	
Freshwater	0.62 µg/L
Marine Water	2.36 µg/L
Sewage Treatment	0.37 mg/L
Terrestrial Organisms	10.9 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation
Iron (7439-89-6)	
Freshwater	No data; unlikely aquatic toxicity
Marine Water	No data; unlikely aquatic toxicity
Sewage Treatment	No data; unlikely aquatic toxicity
Terrestrial Organisms	The mixture is not classified as toxic or harmful
Predators (secondary poisoning)	Insufficient hazard data available (further info necessary)
Chromium (7440-47-3)	
Freshwater	6.5 µg/L
Marine Water	No data; unlikely aquatic toxicity
Sewage Treatment	No data; unlikely aquatic toxicity
Terrestrial Organisms	21.1 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation

Nickel (7440-02-0)	
Freshwater	7.1 µg/L
Marine Water	8.6 µg/L
Sewage Treatment	0.33 µg/L
Terrestrial Organisms	29.9 mg/kg soil dw
Predators (secondary poisoning)	0.12 mg/kg food
Vanadium (7440-62-2)	
Freshwater	7.6 µg/L
Marine Water	2.5 µg/L
Sewage Treatment	450 µg/L
Terrestrial Organisms	7.2 mg/kg soil dw
Predators (secondary poisoning)	0.167 mg/kg food

8.2 Exposure Controls

Personal Protection measures, such as personal protective equipment:

- Use personal protective equipment that is clean and has been properly maintained.
- Store personal protective equipment in a clean place, away from the work area.
- Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using.
- Ensure that there is adequate ventilation, especially in confined areas.

Eye/Face Protection:

- Avoid contact with eyes.
- Wearing glasses is recommended- especially before handling powders or dust emission in accordance with standard ANSI A87, EN 166

Hand Protection:

- Wear suitable protective gloves in the event of prolonged or repeated skin contact.
- Gloves must be selected according to the application and during use at the workstation.
- Use gloves that are resistant to chemical agents in accordance to standard EN ISO 374.
- Protective gloves need to be selected according to their suitability for the workstation in question: other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required. Cut-resistant gloves should be in accordance with standard EN 388 & EN 420

Body Protection:

- Avoid skin contact.
- Wear suitable protective clothing.



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 009
Date of Issue: 07/20/2020 | Version: 1.0

Page | 9 of 15

- Work clothing worn by personnel shall be laundered regularly.
- After contact with the product, all parts of the body that have been soiled must be washed.

Respiratory Protection:

- Avoid breathing dust.
- If the ventilation is insufficient, wear appropriate breathing apparatus.
- When workers are confronted with concentrations that are above occupational exposure limits, they must wear a suitable, approved respiratory protection device.
- Wear a mask that is in accordance to category FFP3 standard EN149.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

General information:

Physical State- Solid

Color- Light gray, metallic orangish-gray to orangish-brown tint.

Important health, safety and environmental information:

pH- not relevant

Boiling Point/Boiling Range- Not relevant

Flash point interval- Not relevant

Vapor Pressure- Not relevant

Density- 7.94 to 8.80 g/cm³ (0.2868 to 0.3179 lbs/in³)

Water Solubility- Insoluble

Melting Point/Melting Range- 1400-1500°C (2552-2732°F)

Self-ignition temperature- Not relevant

Decomposition point/decomposition range- Not relevant

9.2 Other Information: No data available.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Massive metal is stable and not reactive under normal conditions of use, storage and transport.

10.2 Chemical Stability

This element/mixture is stable under the recommended handling and storage conditions in section 7.

10.3 Possibility of Hazardous Reactions

Hydrogen is released in contact with acid which can cause explosive gas mixtures.

10.4 Conditions to Avoid

Formation of dusts and humidity.

10.5 Incompatible Materials

Keep away from: Acids, Nitrates, Fluorides, strong oxidizing agents, phosphorous, ammonia, halogens and Sulphur.

10.6 Hazardous Decomposition Products

The thermal decomposition (welding, burning, brazing) may release or form metal oxide fumes.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Inhalation: May cause allergy or asthma symptoms or breathing difficulties. Inhalation or ingestion of dust or fumes can cause respiratory system damage.

Skin Contact: Repeated or prolonged contact with the mixture may cause removal of natural oil from the skin resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact: Causes serious eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Symptoms related to the physical, chemical and toxicological characteristics: Eye irritation including stinging, tearing, redness, blurred vision and swelling. Difficulty breathing. Dermatitis and rash. If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea,



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 009
Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 1.0

fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Acute Toxicity: May cause an allergic skin reaction.

Skin corrosion/irritation: Prolonged contact can cause irritation.

Respiratory Sensitization: May cause breathing difficulty or asthma symptoms.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: Suspected of causing cancer (inhalation).

Cobalt (7440-48-4)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2B- Possibly carcinogenic to humans
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list
US National Toxicology Program (NTP) Report on Carcinogens	Reasonably anticipated to be a Human Carcinogen

Iron (7439-89-6)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Listed
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Chromium (7440-47-3)	
IARC Monographs, Overall Evaluation of Carcinogenicity	3- Not classifiable as to its carcinogenicity to humans
OSHA Specifically Regulated Substances	Not Listed
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Nickel (7440-02-0)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2- Suspected human carcinogen
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list
US National Toxicology Program (NTP) Report on Carcinogens	Known to be a Human Carcinogen Reasonably anticipated to be a Human Carcinogen

Vanadium (7440-62-2)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Evaluated
OSHA Specifically Regulated Substances	Not Listed
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Evaluated

Reproductive Toxicity: Repeated and prolonged exposure to fumes and dust created in processing this product may cause reproductive effects.

Chronic effects: May cause cancer. Is suspected of damaging an unborn child. Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation.

11.2 Information on Toxicological Effects- Ingredient(s)

Cobalt (7440-48-4)	
LD50 Oral	550mg/kg bw
LD50 Dermal	>2000 mg/kg bw
LC50 Inhalation	<0.05 mg/L

Iron (7439-89-6)	
LD50 Oral	98,600 mg/kg bw
LC50 Inhalation	>0.25mg/L



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 009
Date of Issue: 07/20/2020 | Version: 1.0

Chromium (7440-47-3)	
LD50 Oral	>3400 mg/kg bw
LC50 Inhalation	>5.41mg/L

Nickel (7440-02-0)	
LD50 Oral	>9000 mg/kg/bw
LC50 Inhalation	>10.2mg/L

Vanadium (7440-62-2)	
LD50 Oral	>2000mg/kg bw
LC50 Inhalation	---

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Do not flush into water or sewer system. Do not empty into drains. This product contains substances which are hazardous to the environment.

Cobalt (7440-48-4)	
EC50 Algae	144ug Co/L (exposure 72h) Pseudokirchneriella supcapita
LC50 Freshwater Fish	1.5mg Co/L (exposure 96h) Oncorhynchus mykiss
LC50 Freshwater Fish	85mg Co/L (exposure 96h) Danio rerio
EC50 Microorganisms	120mg Co/L (exposure 3h) Activated sludge
LC50 Crustacea	0.61mg Co/L (exposure 48h) Ceriodaphnia dubia

Iron (7439-89-6)	
EC50 Microorganisms	>10,000 mg/L (exposure 3h) Activated sludge
LC50 Freshwater Fish	>10,000 mg/L (exposure 96h) Danio rerio
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia Magna

Chromium (7440-47-3)	
EC50 Crustacea	0.024mg/L (exposure 48h) Daphnia
EC50 Water Flea	0.025mg/L (exposure 48h) Daphnia magna
EC50 Freshwater Fish	0.002-0.003mg/L (exposure 96h) Oncorhynchus mykiss

Nickel (7440-02-0)	
EC50 Freshwater Algae	0.174 - 0.311 mg/L (exposure 96h) Pseudokirchneriella subcapitata
EC50 Freshwater Algae	=0.18 mg/L (exposure 72h) Pseudokirchneriella subcapitata
LC50 Freshwater Fish	= 10.4mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	= 1.3mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	>100mg/L (exposure 96h) Brachydanio rerio
EC50 Water Flea	=1mg/L (exposure 48h) Daphnia magna
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia magna

Vanadium	
EC50 Microorganisms	>100 mg/L (exposure 3h) Activated sludge
EC50 Algae	2,907ug/L (exposure 72h) Desmodesmus subspicatus
LC50 Freshwater Fish	1,850ug/L (exposure 96h) Pimephales promelas
EC50 Water Flea	2,661ug/L (exposure 48h) Daphnia magna

12.2 Persistence & Degradability: Insoluble in water.

12.3 Bioaccumulation/Accumulation: Not biodegradable.

12.4 Mobility in soil: Nickel in massive form is not mobile in the environment.



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 009
Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 1.0

12.5: Results of PBT and vPvB Assessment: This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.

12.6 Other adverse effects: Avoid unnecessary release into the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Scrap related to metal processing are recovered materials.

13.1 Waste Treatment Methods:

- Do not pour into drains or waterways. Dispose of in accordance with local regulations.

Waste:

- Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.
- Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector.
- Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

Soiled Packaging:

- Give to a certified disposal contractor.

SECTION 14: TRANSPORTATION INFORMATION

Exempt from transport classification and labeling.

ADR, RID, AND, IATA, IMDG- This product is not covered by international regulations on the transport of dangerous goods.

SECTION 15: REGULATORY INFORMATION

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

Classification and labeling information included in section 2:

The following regulations have been used:

EU Regulation No. 1272/2008 amended by EU Regulation No. 2018/1480 (ATP 13)

Regulation (EC) No 1907/2006 Annex XVII Conditions of restriction: 27

Container information:

None available

Usage restrictions apply to the product: See Annex XVII of EC Regulation No. 1907/2006:

For professional users only

Particular provisions:

In accordance with Article 1.3.4 of Annex I of 1272/2008/CE regulations, metals and alloys in massive form do not require a label. Although classified as hazardous according to criteria of the directive, some of these substances are not hazardous for human health by inhalation, ingestion or skin contact, or hazardous to the aquatic environment in the form in which they are placed on the market.

15.2 US Federal Regulations:

Cobalt (7440-48-4)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	0.1%

Iron (7439-89-6)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	Not Listed

Chromium (7440-47-3)	
CERCLA RQ	5,000 lbs RQ [solid metal particles <100µm diameter (0.004")]
SARA Section 313- Emission Reporting	Yes

Nickel- Iron Alloy	
SARA Section 311/312 Hazard Classes	Acute & Delayed Health Hazard

Nickel (7440-02-0)	
Listed on the United States TSCA (Toxic Substances Control Act) Inventory- subject to reporting requirements of US SARA Section 313	



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 009
Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 1.0

CERCLA RQ	100 lb (only applicable if particles are <100µm)
SARA Section 313- Emission Reporting	0.1%

Vanadium (7440-62-2)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	Not Listed

15.3 US State Regulations:

Cobalt (7440-48-4)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

Iron (7439-89-6)	
Not Listed	

Chromium (7440-47-3)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer (Chromium Hexavalent)
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

Nickel (7440-02-0)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

Vanadium (7440-62-2)	
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	

SECTION 16: OTHER INFORMATION

Date of Preparation or Latest Revision: 07/20/2020

Other Information:

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on international, national, and community regulations. The mixture must not be used for other uses than those specified in section



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 009
Revision Date: 07/20/2020 Date of Issue: 07/20/2020 | Version: 1.0

Page | 14 of 15

1 without having first obtained written handling instructions. It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations. The information in this safety data sheet must be regarded as a description of the safety requirements relating to the mixture and not as a guarantee of the properties thereof.

Vista Metals, Inc believes that the information in this safety data sheet is accurate. However, Vista Metals, Inc makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.

H&P Phrases:

H317- May cause an allergic skin reaction.
H334- May cause allergy or asthma symptoms or breathing difficulties if inhaled
H351- Suspected of causing cancer.
H372- Causes damage to organs through prolonged or repeated exposure.
H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).
P201- Obtain special instructions before use.
P202- Do not handle until all safety precautions have been read and understood.
P260- Do not breathe dust/fume/gas/mist/vapors/spray.
P264- Wash... Thoroughly after handling.
P270- Do not eat, drink or smoke when using this product.
P272- Contaminated work clothing should not be allowed out of the workplace.
P280- Wear protective gloves/protective clothing/eye protection/face protection
P281- Use personal protective equipment as required.
P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
P308 & P313- IF exposed or concerned: Get medical advice/attention.
P314- Get medical advice/attention if you feel unwell.
P333 & P313- If irritation or rash occurs, get medical advice/attention.
P362 & P364- Take off contaminated clothing and wash it before use.
P405- Store locked up.
P273- Avoid release to the environment
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

Abbreviations:

ACGIH: American Conference of Governmental Industrial Hygienists
ADR: Alternative Dispute Resolution
AGW: Arbeitsplatzgrenzwerte (occupational exposure limits)
CARC 2: Carcinogenicity category 2
CARC 2B: Carcinogenicity category 2B
CARC 3: Carcinogenicity category 3
CERCLA RQ: Comprehensive Environmental Response, Compensation, and Liability Act Requirements
DGR: Danger
EC50: Half maximal effective concentration
GHS07: Exclamation mark
GHS08: Health Hazard
IATA: International Air Transport Association
IARC: International Agency for Research on Cancer
IDLH: Immediately dangerous to life or health
IMDG: International Maritime Dangerous Goods
INRS: Institute National de la Recherche Scientifique
LC50: Concentration of material in feed or water that is lethal for 50% of exposed population
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PBT: Persistent, bioaccumulate and toxic
PEL: Permissible Exposure Limit
RID: Regulations concerning the International Carriage of Dangerous goods by Rail
SARA: The superfund Amendments and Reauthorization Act



Cobalt, Cobalt-Iron & Iron-Cobalt Alloys

Safety Data Sheet
Revision Date: 07/20/2020

Vista Metals' SDS Nbr: 009
Date of Issue: 07/20/2020 | Version: 1.0

Page | 15 of 15

SKIN SENS. 1: Skin sensitivity category 1

STOT RE 1: Specific Target Organ Toxicity Repeated Exposure

SVHC: Substance of Very High Concern

TLV: Threshold Limit Value

vPvB: Very persistent, very bioaccumulate

WEL: Workplace Exposure Limits

END

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

1.1 Product Identifier (s)

Product Name: Nickel-Copper Alloys
 Chemical Family: Metal Alloys
 Synonyms: Nickel-Copper, Nickel-Copper Filler Metals
 Trade Names/Alloy Designations: **400, 400FM, 400H, 400HW, 400L, 400M, 404, 404J, 405, 418FM, 60FM (816)**

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

Metal Working- Bar, Rod, Wire, Strip & Cut Lengths

Use Descriptor system (REACH):

PC7: Base metals and alloys

1.3 Details of the Supplier of Safety Data Sheet

Company

Vista Metals, Inc
 65 Ballou Blvd
 Bristol, RI 02809
 Phone: 401-253-1772 Fax: 401-253-1806
<https://vismet.com/>

1.4 Emergency Telephone Number

Vista Metals: 401-253-1772 Association/Organization: INRS/ORFILA <http://www.centres-antipoison> Ph: +33 (0)1 45 42 59 59

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification with EC regulation No. 1272/2008 and its amendments

Skin Sensitivity-1 H317
 Carcinogenicity-2 H351
 STOT (repeated exposure)-1 H372

This substance does not present a physical hazard. Consult other references for additional products present on site. No known or foreseeable environmental damage under standard conditions of use.

Full text of hazard classes and H-statements: see Section 16.

2.2 Label Elements

In compliance with EC regulation No. 1272/2008 and its amendments

Hazard Pictograms (GHS)



Signal Word (GHS)

: DANGER

Hazard Statements

: H317- May cause an allergic skin reaction.
 H351- Suspected of causing cancer.
 H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).

Precautionary Statements (Prevention)

: P201- Obtain special instructions before use.
 P202- Do not handle until all safety precautions have been read and understood.
 P260- Do not breathe dust/fume/gas/mist/vapors/spray.
 P261- Avoid breathing dust/fume/gas/mist/vapors/spray
 P264- Wash.... Thoroughly after handling.
 P270- Do not eat, drink or smoke when using this product.
 P272- Contaminated work clothing should not be allowed out of the workplace.
 P280- Wear protective gloves/protective clothing/eye protection/face protection
 P281- Use personal protective equipment as required.

Precautionary Statements (Response)

: P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
 P308 & P313- IF exposed or concerned: Get medical advice/attention.
 P314- Get medical advice/attention if you feel unwell
 P333 & P313- If irritation or rash occurs, get medical advice/attention.
 P362 & P364- Take off contaminated clothing and wash it before use.



Nickel-Copper Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 010
Revision Date: 06/08/2020 Date of Issue: 06/08/2020 | Version: 1.0

Precautionary Statements (Storage) : P405- Store locked up.

Precautionary Statements (Disposal) : P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other Hazards

- **WARNING!** Exposure to dust or fumes can cause eye, skin, respiratory tract infection and flu-like illness. Inhalation or ingestion of dust or fumes can cause respiratory system damage. May cause an allergic skin reaction, and eye and mucous membrane irritation may occur. Contains materials that may cause cancer and/or nervous system effects. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. **Wash hands thoroughly after handling.**
- Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).
- The mixture does not contain substances classified as "Substances of Very High Concern" (SVHC) $\geq 0.1\%$ published by the European Chemicals Agency (ECHA) under article 57 of REACH: <http://echa.europa.edu/fr/candidate-list-table>
- This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.
- This substance may not require a label according to Article 17 (see section 1.3.3.2 of Annex I).
- Metals in massive form, alloys, mixtures containing polymers, and mixtures containing elastomers, do not require a label according to the provisions of this Annex, if they do not present a hazard to human health by inhalation, ingestion or contact with skin or to the aquatic environment in the form in which they are placed on the market, although classified in accordance with the criteria of this Annex.
- The supplier shall provide the information which shall have appeared on the label to downstream users or distributors in the safety data sheet.
- Hazards not otherwise classified (HNOC) Harmful to aquatic organisms.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Composition of Component

Name	Product Identifier	%	GHS Classification & EC 1272/2008
Nickel	INDEX: 028-002-00-7 CAS: 7440-02-0 EC: 231-111-4	$50 \leq X < 100$	GHS08 • GHS07 • DGR • CARC. 2, H351 STOT RE 1, H372 • SKIN SENS. 1, H317
Copper	INDEX: 7440-50-8 CAS: 7440-50-8 EC: 231-159-6 REACH: 1-2119480154-42	$25 \leq X < 50$	Comb. Dust- Maximum WELs are available
Manganese	INDEX: 7439-96-5 CAS: 7439-96-5 EC: 231-105-1	$0 \leq X < 2.5$	Comb. Dust- Maximum WELs are available

Full text of H-phrases, see Section 16



Nickel-Copper Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 010
Date of Issue: 06/08/2020 | Version: 1.0

3.1.2 Base Metal & Alloying Elements:

Components	CAS Nbr	Exposure Limits			
		ACGIH TLV (mg/m3)	OSHA PEL (mg/m3)		
Iron (Fe)	7439-89-6	5	Oxide Dust / Fume	10	Oxide Dust / Fume
Nickel (Ni)	7440-02-0	1.5	Metal	1	Metal and Insoluble Component
Chromium (Cr)	7440-47-3	0.5	Metals	1	Metal
Aluminum (Al)	7429-90-5	10 5	Dust Fume	15 5	Dust Respirable fraction
Boron (B)	7440-42-8	10	Oxide Dust	15	Oxide Dust
Carbon (C)	7440-44-0	-	Not Established	-	Not Established
Cobalt (Co)	7440-48-4	0.02	As Cobalt (A3 Carcinogen)	0.1	Metal / Dust / Fume
Copper (Cu)	7440-50-8	1 0.2	Dust Fume	1 0.1	Dust Fume
Lead (Pb)	7439-92-1	0.05	Dust/Fume (A3 Carcinogen)	0.05	Dust / Fume
Manganese(Mn)	7439-96-5	0.2	Elemental Mn & Inorganic Compounds	5	Insoluble Compounds
Molybdenum(Mo)	7439-98-7	10	Insoluble Compounds	15	Insoluble Compounds
Niobium (Nb)	7440-03-1	-	Not Established	-	Not Established
Phosphorous(P)	7723-14-0	0.1	Phosphorus	0.1	Phosphorus
Silicon (Si)	7440-21-3	10	Dust	15	Dust
Sulfur (S)	7446-09-05	5.2 13	Sulfur Dioxide Sulfur Dioxide (STEL)	13	Sulfur Dioxide
Titanium (Ti)	7440-32-6	-	Not Established	-	Not Established
Tungsten (W)	7440-33-7	5	Insoluble Compounds as W Insoluble Compounds as W (STEL)	-	Not Established
Vanadium (V)	7440-62-2	0.05	Oxide Dust / Fume	0.5 0.1	Oxide Dust (Ceiling) Oxide Fume (Ceiling)
Zinc (Zn)	7440-66-6	10 5 10	Oxide Dust Oxide Fume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measure:

General: As a general rule, in case of any doubt or if symptoms persist, always call a doctor.

NEVER induce swallowing by an unconscious person.

Inhalation: If inhaled, remove to fresh air and keep at rest in a comfortable breathing position. Get immediate medical attention if breathing difficulty persists or if person has stopped breathing.

Skin Contact: Remove contaminated clothing and wash skin with water and soap or recognized cleaner. Wash contaminated clothing before reuse. Watch out for any remaining product in skin, clothing, shoes, watches, etc. In the event of an allergic reaction, seek medical attention. If the contaminated area is widespread or there is damage to the skin, a doctor must be consulted or the patient transferred to hospital.

Eye Contact: Immediately rinse with water [eyes open] for at least 15 minutes. Remove contact lenses if present and easy to do- continue rinsing. If there is any redness, pain or visual impairment, obtain medical attention.

Ingestion: If swallowed, seek medical attention immediately and bring label or this safety sheet. Not an expected route of exposure.

4.2 Most important symptoms and effects, both acute and delayed

General: Skin sensitization. May cause cancer. Is suspected of damaging an unborn child. Under normal condition of use, this material is not anticipated to present a significant hazard. If metal dust is produced, it can cause irritation of the skin and respiratory tract and can be harmful.

Inhalation: If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection. Exposure to inhalation to high levels of manganese can result in an illness called manganism- resulting in lethargy and weakness, and can progress to other symptoms such as dizziness, and speech and psychological disturbances

Skin contact: Dust can get stuck in skin folds or by contact with tight clothing.

Eye Contact: Dust that is generated can get stuck in eye, along with slivers as well. Fumes, dust and slivers will most likely cause eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Chronic Symptoms: Nickel compounds and Metallic nickel may cause cancer. Is suspected of damaging an unborn child. Extended exposure to excessive concentrations of metal fumes and dusts can be associated in permanent changes in the lung function and pulmonary diseases.



Nickel-Copper Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 010
Date of Issue: 06/08/2020 | Version: 1.0

Page | 4 of 12

- Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).

4.3 Indication of any immediate medical attention and special treatment needed

In case of injury, make sure the person is up to date with anti-tetanus vaccine. If medical advice is necessary, bring label or safety sheet with you.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media: Non-flammable in massive form. Only dust generated by the processing of metal may be flammable. Do not use water when molten material is involved. The combination of hot product and water will result in an extreme explosion.

5.2 Special hazards arising from the substance or mixture: A fire will often produce a thick, black smoke. Exposure to decomposition byproducts may be hazardous to health. Do not breathe in smoke. Fumes may cause metal fumes fever. **DO NOT use water on molten metal: an explosion hazard could result. DO NOT BREATHE IN SMOKE!**

5.3 Advice for firefighters: Use self-contained breathing apparatus (NIOSH-approved) and full protective clothing must be worn in case of fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, protective equipment & emergency procedures:

- Consult the safety measures listed under sections 7 & 8.
- For non fire-fighters: Avoid any contact with the skin and eyes.
- For fire-fighters: Be equipped with suitable personal protective equipment (see section 8).

6.2 Environmental precautions:

- Prevent any material from entering drains or waterways.

6.3 Methods and material for containment and cleaning up:

- Retrieve the product by mechanical means [sweeping/vacuuming].
- Stop the flow of material if you are without risk.

6.4 Reference to other sections:

- For safety measures and personal protection, see sections 7 & 8.

SECTION 7: HANDLING AND STORAGE

Requirements relating to storage remises apply to all facilities where the mixture is handled.

Individuals with a history of skin sensitization should not, under any circumstances, handle this mixture.

7.1 Precautions for safe handling:

- Always wash hands after handling.
- Remove and wash contaminated clothing before re-using.

Fire Prevention:

- Prevent access by unauthorized personnel.

Recommended equipment and procedures:

- For personal protection, see section 8.
- Avoid inhaling dust.
- Also provide breathing apparatus for certain short tasks of an exceptional nature and for emergency interventions.
- In all cases, recover emissions at source.

Prohibited equipment and procedures:

- No smoking, eating or drinking in areas where the mixture is used.

7.2 Conditions for safe storage, including any incompatibilities:

- Store in dry and ventilated area.
- Do not store in a corrosive environment to avoid alloy's oxidation.
- Packaging: Always keep in packaging made of an identical material to the original.

7.3 Specific end use(s): No data available



Nickel-Copper Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 010
 Revision Date: 06/08/2020 Date of Issue: 06/08/2020 | Version: 1.0

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters:

Occupational exposure limits:

Nickel (7440-02-0)		
USA ACGIH	ACGIH TWA (mg/m ³)	1.5 mg/m ³ – as inhalable fraction
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.015 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	10mg Ni/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³
Copper (7440-50-8)		
USA ACGIH	ACGIH TWA (mg/m ³)	1 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1 mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	1 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	No evidence [**Effective** IDLH=2,000mg Cu/m ³]
FRANCE	INRS-ED984 (VME) (mg/m ³)	Not Reported
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0.11 mg/m ³ [ceiling 0.21mg/ m ³]
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.2 mg/ m ³
Manganese (7439-96-5)		
USA ACGIH	ACGIH TWA (mg/m ³)	1 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	C 5mg/ m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	1mg/m ³
USA IDLH	USA IDLH (mg/m ³)	No evidence [*Effective IDLH=10,000mg Mn/ m ³]
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,02 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.5 mg/m ³

DNEL (Derived No Effect Level):

Nickel (7440-02-0)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	11.9 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.05mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.05mg Ni/m ³
General Population	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	0.37 mg Ni ion/kgbw/day
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	0.8 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.00006mg Ni/m ³
		Oral	0.011mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.00006mg Ni/m ³



Nickel-Copper Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 010
Date of Issue: 06/08/2020 | Version: 1.0

Copper (7440-50-8)			
Workers	Acute- Systemic Effects	Dermal	273 mg/kg/bw/day
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	1mg/m3
		Ocular	No hazard identified
	Long-term- Systemic Effects	Dermal	137 mg/kg/bw/day
		Inhalation	No hazard identified
	Long-term- Local Effects	Dermal	No hazard identified
Inhalation		1 mg/m3	
General Population	Acute- Systemic Effects	Dermal	273 mg/kg/bw/day
		Inhalation	No hazard identified
		Oral	Low hazard [no threshold derived]
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	1mg/m3
	Long-term- Systemic Effects	Dermal	137 mg/kg/bw/day
		Inhalation	No hazard identified
		Oral	0.041 mg/kg/bw/day
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	1mg/m3

Manganese (7439-96-5)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	0.2mg/m3
		Ocular	No hazard identified
	Long-term- Systemic Effects	Dermal	0.004 mg/kg bw/day
		Inhalation	0.2mg/m3
	Long-term- Local Effects	Dermal	No hazard identified
Inhalation		0.2mg/m3	
General Population	Acute- Systemic Effects	Dermal	No threshold effect
		Inhalation	No hazard identified
		Oral	Exposure based waiving
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	Exposure based waiving
	Long-term- Systemic Effects	Dermal	0.002 mg/kg bw/day
		Inhalation	0.041mg/m3
		Oral	No threshold effect
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	0.041mg/m3

PNEC (Predicted No Effect Concentration):

Nickel (7440-02-0)	
Freshwater	7.1 µg/L
Marine Water	8.6 µg/L
Sewage Treatment	0.33 µg/L
Terrestrial Organisms	29.9 mg/kg soil dw
Predators (secondary poisoning)	0.12 mg/kg food



Nickel-Copper Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 010
Date of Issue: 06/08/2020 | Version: 1.0

Copper (7440-50-8)	
Freshwater	7.8 µg/L
Marine Water	5.2 µg/L
Sewage Treatment	230 mg/L
Terrestrial Organisms	65 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation

Manganese (7439-96-5)	
Freshwater	0.034 mg/L
Marine Water	0.003 mg/L
Sewage Treatment	100 mg/L
Terrestrial Organisms	3.4 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation

8.2 Exposure Controls

Personal Protection measures, such as personal protective equipment:

- Use personal protective equipment that is clean and has been properly maintained.
- Store personal protective equipment in a clean place, away from the work area.
- Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using.
- Ensure that there is adequate ventilation, especially in confined areas.

Eye/Face Protection:

- Avoid contact with eyes.
- Wearing glasses is recommended- especially before handling powders or dust emission in accordance with standard ANSI A87, EN 166

Hand Protection:

- Wear suitable protective gloves in the event of prolonged or repeated skin contact.
- Gloves must be selected according to the application and during use at the workstation.
- Protective gloves need to be selected according to their suitability for the workstation in question: other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required. Cut-resistant gloves should be in accordance with standard EN 388 & EN 420

Body Protection:

- Avoid skin contact.
- Wear suitable protective clothing.
- Work clothing worn by personnel shall be laundered regularly.
- After contact with the product, all parts of the body that have been soiled must be washed.

Respiratory Protection:

- Avoid breathing dust.
- If the ventilation is insufficient, wear appropriate breathing apparatus.
- When workers are confronted with concentrations that are above occupational exposure limits, they must wear a suitable, approved respiratory protection device.
- Wear a mask that is in accordance to category FFP3 standard EN149.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

General information:

Physical State- Solid

Color- Light metallic silver-gray to brownish-gray

Important health, safety and environmental information:

pH- Not relevant

Boiling Point/Boiling Range- Not relevant

Flash point interval- Not relevant

Vapor Pressure- Not relevant

Density- 8.9 g/cm³ (0.321533 lbs/in³)



Nickel-Copper Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 010
Date of Issue: 06/08/2020 | Version: 1.0

Water Solubility- Insoluble

Melting Point/Melting Range- 1316°C (2400°F)

Self-ignition temperature- Not specified

Decomposition point/decomposition range- Not specified

9.2 Other Information: No data available.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Massive metal is stable and not reactive under normal conditions of use, storage and transport.

10.2 Chemical Stability

This element/mixture is stable under the recommended handling and storage conditions in section 7.

10.3 Possibility of Hazardous Reactions

No data available

10.4 Conditions to Avoid

Formation of dusts and humidity. Dusts can form an explosive mixture with air.

10.5 Incompatible Materials

Keep away from: Acids & Strong Oxidizing Agents

10.6 Hazardous Decomposition Products

The thermal decomposition (welding, burning, brazing) may release or form metal oxide fumes.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Inhalation: May cause allergy or asthma symptoms or breathing difficulties. Inhalation or ingestion of dust or fumes can cause respiratory system damage in the event of repeated or prolonged exposure. Suspected human carcinogen.

Skin Contact: Repeated or prolonged contact with the mixture may cause removal of natural oil from the skin resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact: Causes serious eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Symptoms related to the physical, chemical and toxicological characteristics: Eye irritation including stinging, tearing, redness, blurred vision and swelling. Difficulty breathing. Dermatitis and rash. If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection. Exposure to inhalation to high levels of manganese can result in an illness called manganism- resulting in lethargy and weakness, and can progress to other symptoms such as dizziness, and speech and psychological disturbances.

Acute Toxicity: May cause an allergic skin reaction.

Skin corrosion/irritation: Prolonged contact can cause irritation.

Respiratory Sensitization: May cause breathing difficulty or asthma symptoms.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: Suspected of causing cancer.

Nickel (7440-02-0)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2- Suspected Human carcinogen
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen List
US National Toxicology Program (NTP) Report on Carcinogens	Known to be a Human Carcinogen Reasonably anticipated to be a Human Carcinogen

Copper (7440-50-8)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed



Nickel-Copper Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 010
Date of Issue: 06/08/2020 | Version: 1.0

Manganese (7439-96-5)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Reproductive Toxicity: Repeated and prolonged exposure to fumes and dust created in processing this product may cause reproductive effects.
Chronic effects: May cause cancer. Is suspected of damaging an unborn child. Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Exposure to inhalation to high levels of manganese can result in an illness called manganism- resulting in lethargy and weakness, and can progress to other symptoms such as dizziness, and speech and psychological disturbances.

11.2 Information on Toxicological Effects- Ingredient(s)

Nickel (7440-02-0)	
LD50 Oral	>9000 mg/kg/bw
LC50 Inhalation	>10.2mg/L

Copper (7440-50-8)	
LD50 Oral	472 mg/kg bw
LC50 Inhalation	0.73 mg/L

Manganese (7439-96-5)	
LD50 Oral	>2000 mg/kg bw
LC50 Inhalation	Not listed

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Do not flush into water or sewer system. Do not empty into drains. This product contains substances which are hazardous to the environment.

Nickel (7440-02-0)	
EC50 Freshwater Algae	0.174 - 0.311 mg/L (exposure 96h) Pseudokirchneriella subcapitata
EC50 Freshwater Algae	=0.18 mg/L (exposure 72h) Pseudokirchneriella subcapitata
LC50 Freshwater Fish	= 10.4mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	= 1.3mg/L (exposure 96h) Cyprinus carpio
LC50 Freshwater Fish	>100mg/L (exposure 96h) Brachydanio rerio
EC50 Water Flea	=1mg/L (exposure 48h) Daphnia magna
EC50 Water Flea	>100mg/L (exposure 48h) Daphnia magna

Copper (7440-50-8)	
EC50 Algae	0.0426-0.0535 mg/L (exposure 72h)
LC50 Freshwater Fish	0.15 mg/L (exposure 96h) Oncorhynchus mykiss
LC50 Freshwater Fish	0.8 mg/L (exposure 96h) Cuprinus carpio
EC50 Microorganisms	Not Listed
EC50 Water Flea	0.03 mg/L (exposure 48h) Daphnia magna

Manganese (7439-96-5)	
EC50 Microorganisms	Not Listed
LC50 Freshwater Fish	>3.6 mg/L (exposure 96h) Oncorhynchus mykiss
EC50 Water Flea	Not Listed



Nickel-Copper Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 010
Date of Issue: 06/08/2020 | Version: 1.0

12.2 Persistence & Degradability: Insoluble in water.

12.3 Bioaccumulation/Accumulation: Not biodegradable.

12.4 Mobility in soil: Nickel in massive form is not mobile in the environment.

12.5: Results of PBT and vPvB Assessment: This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.

12.6 Other adverse effects: Avoid unnecessary release into the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Scrap related to metal processing are recovered materials.

13.1 Waste Treatment Methods:

- Do not pour into drains or waterways. Dispose of in accordance with local regulations.

Waste:

- Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.
- Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector.
- Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

Soiled Packaging:

- Give to a certified disposal contractor.

SECTION 14: TRANSPORTATION INFORMATION

Exempt from transport classification and labeling.

ADR, RID, AND, IATA, IMDG- This product is not covered by international regulations on the transport of dangerous goods.

SECTION 15: REGULATORY INFORMATION

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

Classification and labeling information included in section 2:

The following regulations have been used:

EU Regulation No. 1272/2008 amended by EC 790/2009

Container information:

None available

Usage restrictions apply to the product: See Annex XVII of EC Regulation No. 1907/2006:

For professional users only

Particular provisions:

In accordance with Article 1.3.4 of Annex I of 1272/2008/CE regulations, metals and alloys in massive form do not require a label. Although classified as hazardous according to criteria of the directive, some of these substances are not hazardous for human health by inhalation, ingestion or skin contact, or hazardous to the aquatic environment in the form in which they are placed on the market.

15.2 US Federal Regulations:

Nickel- Iron Alloy	
SARA Section 311/312 Hazard Classes	Acute & Delayed Health Hazard

Nickel (7440-02-0)	
Listed on the United States TSCA (Toxic Substances Control Act) Inventory- subject to reporting requirements of US SARA Section 313	
CERCLA RQ	100 lb (only applicable if particles are <100µm)
SARA Section 313- Emission Reporting	0.1%

Copper (7440-50-8)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	0.1%



Nickel-Copper Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 010
Date of Issue: 06/08/2020 | Version: 1.0

Manganese (7439-96-5)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	1.0%

15.3 US State Regulations:

Nickel (7440-02-0)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

Copper (7440-50-8)	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

Manganese (7439-96-5)	
US- Massachusetts-Right to Know Hazardous Substances List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

SECTION 16: OTHER INFORMATION

Date of Preparation or Latest Revision: 6/8/2020

Other Information:

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on international, national, and community regulations. The mixture must not be used for other uses than those specified in section 1 without having first obtained written handling instructions. It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations. The information in this safety data sheet must be regarded as a description of the safety requirements relating to the mixture and not as a guarantee of the properties thereof.

Vista Metals, Inc believes that the information in this safety data sheet is accurate. However, Vista Metals, Inc makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.



Nickel-Copper Alloys

Safety Data Sheet
Revision Date: 06/08/2020

Vista Metals' SDS Nbr: 010
Date of Issue: 06/08/2020 | Version: 1.0

H&P Phrases:

H317- May cause an allergic skin reaction.
H351- Suspected of causing cancer.
H372- Causes damage to organs through prolonged or repeated exposure.
H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).
P201- Obtain special instructions before use.
P202- Do not handle until all safety precautions have been read and understood.
P260- Do not breathe dust/fume/gas/mist/vapors/spray.
P261- Avoid breathing dust/fume/gas/mist/vapors/spray
P264- Wash.... Thoroughly after handling.
P270- Do not eat, drink or smoke when using this product.
P272- Contaminated work clothing should not be allowed out of the workplace.
P280- Wear protective gloves/protective clothing/eye protection/face protection
P281- Use personal protective equipment as required.
P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
P308 & P313- IF exposed or concerned: Get medical advice/attention.
P314- Get medical advice/attention if you feel unwell.
P333 & P313- If irritation or rash occurs, get medical advice/attention.
P362 & P364- Take off contaminated clothing and wash it before use.
P405- Store locked up.
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

Abbreviations:

ACGIH: American Conference of Governmental Industrial Hygienists
ADR: Alternative Dispute Resolution
AGW: Arbeitsplatzgrenzwerte (occupational exposure limits)
CARC 2: Carcinogenicity category 2
CERCLA RQ: Comprehensive Environmental Response, Compensation, and Liability Act Requirements
DGR: Danger
EC50: Half maximal effective concentration
GHS07: Exclamation mark
GHS08: Health Hazard
IATA: International Air Transport Association
IARC: International Agency for Research on Cancer
IDLH: Immediately dangerous to life or health
IMDG: International Maritime Dangerous Goods
INRS: Institute National de la Recherche Scientifique
LC50: Concentration of material in feed or water that is lethal for 50% of exposed population
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PBT: Persistent, bioaccumulate and toxic
PEL: Permissible Exposure Limit
RID: Regulations concerning the International Carriage of Dangerous goods by Rail
SARA: The superfund Amendments and Reauthorization Act
SKIN SENS. 1: Skin sensitivity category 1
STOT RE 1: Specific Target Organ Toxicity Repeated Exposure
SVHC: Substance of Very High Concern
TLV: Threshold Limit Value
vPvB: Very persistent, very bioaccumulate
WEL: Workplace Exposure Limits

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

1.1 Product Identifier (s)

Product Name: Copper-Nickel-Tin & Copper-Tin-Nickel Alloys
 Chemical Name: Metal Alloy(s)
 Chemical Family: Copper-Nickel-Tin bearing alloys
 Synonyms/Trade Names/Alloy Designations: **1000, 1015 - Phos Bronzes: 510, 511 & 521 – Cupro Nickels: 725, 729**

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

Metal Working- Bar, Rod, Wire & Strip

Use Descriptor system (REACH):

PC7: Base metals and alloys

1.3 Details of the Supplier of Safety Data Sheet

Company

Vista Metals, Inc
 65 Ballou Blvd
 Bristol, RI 02809
 Phone: 401-253-1772 Fax: 401-253-1806
<https://vismet.com/>

1.4 Emergency Telephone Number

Vista Metals: 401-253-1772 Association/Organization: INRS/ORFILA <http://www.centres-antipoison> Ph: +33 (0)1 45 42 59 59

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification with EC regulation No. 1272/2008 and its amendments

Skin Sensitivity-1 H317
 Carcinogenicity-2 H351
 STOT (repeated exposure)-2 H372

This substance does not present a physical hazard. Consult other references for additional products present on site. No known or foreseeable environmental damage under standard conditions of use.

Full text of hazard classes and H-statements: see Section 16.

2.2 Label Elements

In compliance with EC regulation No. 1272/2008 and its amendments

Hazard Pictograms (GHS)



Signal Word (GHS)

: WARNING

Hazard Statements

: H317- May cause an allergic skin reaction.
 H351- Suspected of causing cancer.
 H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).

Precautionary Statements (Prevention)

: P201- Obtain special instructions before use.
 P202- Do not handle until all safety precautions have been read and understood.
 P260- Do not breathe dust/fume/gas/mist/vapors/spray.
 P261- Avoid breathing dust/fume/gas/mist/vapors/spray
 P264- Wash.... Thoroughly after handling.
 P272- Contaminated work clothing should not be allowed out of the workplace.
 P280- Wear protective gloves/protective clothing/eye protection/face protection
 P281- Use personal protective equipment as required.

Precautionary Statements (Response)

: P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
 P308 & P313- IF exposed or concerned: Get medical advice/attention.
 P314- Get medical advice/attention if you feel unwell.
 P321- Specific treatment (see... on this label)
 P333 & P313- If irritation or rash occurs, get medical advice/attention.
 P362 & P364- Take off contaminated clothing and wash it before use.



Copper-Nickel-Tin & Copper-Tin-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 011
Revision Date: 07/27/2020 Date of Issue: 07/27/2020 | Version: 1.0

Precautionary Statements (Storage) : P405- Store locked up.

Precautionary Statements (Disposal) : P273- Avoid release to the environment
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other Hazards

- **WARNING!** Exposure to dust or fumes can cause eye, skin, respiratory tract infection and flu-like illness. Inhalation or ingestion of dust or fumes can cause respiratory system damage. May cause an allergic skin reaction, and eye and mucous membrane irritation may occur. Contains materials that may cause cancer and/or nervous system effects. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. **Wash hands thoroughly after handling.**
- Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).
- The mixture does not contain substances classified as "Substances of Very High Concern" (SVHC) $\geq 0.1\%$ published by the European Chemicals Agency (ECHA) under article 57 of REACH: <http://echa.europa.edu/fr/candidate-list-table>
- This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.
- This substance may not require a label according to Article 17 (see section 1.3.3.2 of Annex I).
- Metals in massive form, alloys, mixtures containing polymers, and mixtures containing elastomers, do not require a label according to the provisions of this Annex, if they do not present a hazard to human health by inhalation, ingestion or contact with skin or to the aquatic environment in the form in which they are placed on the market, although classified in accordance with the criteria of this Annex.
- The supplier shall provide the information which shall have appeared on the label to downstream users or distributors in the safety data sheet.
- Hazards not otherwise classified (HNOC) Harmful to aquatic organisms.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Composition of Component

Name	Product Identifier	%	GHS Classification & EC 1272/2008
Copper	INDEX: 7440-50-8 CAS: 7440-50-8 EC: 231-159-6 REACH: 1-2119480154-42	$83 \leq X < 99.8$	Comb. Dust
Nickel	INDEX: 028-002-00-7 CAS: 7440-02-0 EC: 231-111-4	$0.1 \leq X < 25$	GHS08 • GHS07 • DGR • CARC. 2, H351 STOT RE 1, H372 • SKIN SENS. 1, H317
Tin	INDEX: 7440-31-5 CAS: 7440-31-5 EC: 231-141-8	$0.1 \leq X < 16$	Comb. Dust

Full text of H-phrases, see Section 16



Copper-Nickel-Tin & Copper-Tin-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 011
Revision Date: 07/27/2020 Date of Issue: 07/27/2020 | Version: 1.0

3.1.2 Base Metal & Alloying Elements:

Components	CAS Nbr	Exposure Limits			
		ACGIH TLV (mg/m3)	OSHA PEL (mg/m3)		
Iron (Fe)	7439-89-6	5	Oxide Dust / Fume	10	Oxide Dust / Fume
Nickel (Ni)	7440-02-0	1.5	Metal	1	Metal and Insoluble Component
Chromium (Cr)	7440-47-3	0.5	Metals	1	Metal
Aluminum (Al)	7429-90-5	10 5	Dust Fume	15 5	Dust Respirable fraction
Boron (B)	7440-42-8	10	Oxide Dust	15	Oxide Dust
Carbon (C)	7440-44-0	-	Not Established	-	Not Established
Cobalt (Co)	7440-48-4	0.02	As Cobalt (A3 Carcinogen)	0.1	Metal / Dust / Fume
Copper (Cu)	7440-50-8	1 0.2	Dust Fume	1 0.1	Dust Fume
Lead (Pb)	7439-92-1	0.05	Dust/Fume (A3 Carcinogen)	0.05	Dust / Fume
Manganese(Mn)	7439-96-5	0.2	Elemental Mn & Inorganic Compounds	5	Insoluble Compounds
Molybdenum(Mo)	7439-98-7	10	Insoluble Compounds	15	Insoluble Compounds
Niobium (Nb)	7440-03-1	-	Not Established	-	Not Established
Phosphorous(P)	7723-14-0	0.1	Phosphorus	0.1	Phosphorus
Silicon (Si)	7440-21-3	10	Dust	15	Dust
Sulfur (S)	7446-09-05	5.2 13	Sulfur Dioxide Sulfur Dioxide (STEL)	13	Sulfur Dioxide
Titanium (Ti)	7440-32-6	-	Not Established	-	Not Established
Tungsten (W)	7440-33-7	5	Insoluble Compounds as W Insoluble Compounds as W (STEL)	-	Not Established
Vanadium (V)	7440-62-2	0.05	Oxide Dust / Fume	0.5 0.1	Oxide Dust (Ceiling) Oxide Fume (Ceiling)
Zinc (Zn)	7440-66-6	10 5 10	Oxide Dust Oxide Fume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measure:

General: As a general rule, in case of any doubt or if symptoms persist, always call a doctor.

NEVER induce swallowing by an unconscious person.

Inhalation: If inhaled, remove to fresh air and keep at rest in a comfortable breathing position. Get immediate medical attention if breathing difficulty persists or if person has stopped breathing.

Skin Contact: Remove contaminated clothing and wash skin with water and soap or recognized cleaner. Wash contaminated clothing before reuse. Watch out for any remaining product in skin, clothing, shoes, watches, etc. In the event of an allergic reaction, seek medical attention. If the contaminated area is widespread or there is damage to the skin, a doctor must be consulted or the patient transferred to hospital.

Eye Contact: Immediately rinse with water [eyes open] for at least 15 minutes. Remove contact lenses if present and easy to do- continue rinsing. If there is any redness, pain or visual impairment, obtain medical attention.

Ingestion: If swallowed, seek medical attention immediately and bring label or this safety sheet.

4.2 Most important symptoms and effects, both acute and delayed

General: Skin sensitization. May cause cancer. Is suspected of damaging an unborn child. Under normal condition of use, this material is not anticipated to present a significant hazard. If metal dust is produced, it can cause irritation of the skin and respiratory tract and can be harmful.

Inhalation: If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Skin contact: Dust can get stuck in skin folds or by contact with tight clothing.

Eye Contact: Dust that is generated can get stuck in eye, along with slivers as well. Fumes, dust and slivers will most likely cause eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Chronic Symptoms: Nickel compounds and Metallic nickel may cause cancer. Is suspected of damaging an unborn child. Extended exposure to excessive concentrations of metal fumes and dusts can be associated in permanent changes in the lung function and pulmonary diseases.

- Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation. Nickel Compounds and Metallic Nickel are listed in the Annual report on Carcinogens as prepared by the National Toxicology Program (NTP). Nickel Compounds



Copper-Nickel-Tin & Copper-Tin-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 011
Revision Date: 07/27/2020 Date of Issue: 07/27/2020 | Version: 1.0

Page | 4 of 12

are **known to be human carcinogens**, while Metallic Nickel (CAS No. 7440-02-0) is **reasonably anticipated to be a human carcinogen** (2016). Nickel compounds and Metallic Nickel are also listed in the Monograph Series of the international Agency for Research on Cancer (IARC). According to the latest research on IARC, there is **sufficient evidence** in humans for the carcinogenicity of mixtures that include nickel compounds and nickel metal, and **sufficient evidence** in experimental animals for the carcinogenicity of nickel compounds and nickel metal (2012).

4.3 Indication of any immediate medical attention and special treatment needed

In case of injury, make sure the person is up to date with anti-tetanus vaccine. If medical advice is necessary, bring label or safety sheet with you.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media: Non-flammable in massive form. Only dust generated by the processing of metal may be flammable. Do not use water when molten material is involved. The combination of hot product and water will result in an extreme explosion.

5.2 Special hazards arising from the substance or mixture: A fire will often produce a thick, black smoke. Exposure to decomposition byproducts may be hazardous to health. Do not breathe in smoke. Fumes may cause metal fumes fever. **DO NOT use water on molten metal: an explosion hazard could result. DO NOT BREATHE IN SMOKE!**

5.3 Advice for firefighters: Use self-contained breathing apparatus (NIOSH-approved) and full protective clothing must be worn in case of fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, protective equipment & emergency procedures:

- Consult the safety measures listed under sections 7 & 8.
- For non fire-fighters: Avoid any contact with the skin and eyes.
- For fire-fighters: Be equipped with suitable personal protective equipment (see section 8).

6.2 Environmental precautions:

- Prevent any material from entering drains or waterways.

6.3 Methods and material for containment and cleaning up:

- Retrieve the product by mechanical means [sweeping/vacuuming].
- Stop the flow of material if you are without risk.

6.4 Reference to other sections:

- For safety measures and personal protection, see sections 7 & 8.

SECTION 7: HANDLING AND STORAGE

Requirements relating to storage remises apply to all facilities where the mixture is handled.

Individuals with a history of skin sensitization should not, under any circumstances, handle this mixture.

7.1 Precautions for safe handling:

- Always wash hands after handling.
- Remove and wash contaminated clothing before re-using.

Fire Prevention:

- Prevent access by unauthorized personnel.

Recommended equipment and procedures:

- For personal protection, see section 8.

Prohibited equipment and procedures:

- No smoking, eating or drinking in areas where the mixture is used.

7.2 Conditions for safe storage, including any incompatibilities:

- Store in dry and ventilated area.
- Do not store in a corrosive environment to avoid alloy's oxidation.
- Packaging: Always keep in packaging made of an identical material to the original.

7.3 Specific end use(s): No data available



Copper-Nickel-Tin & Copper-Tin-Nickel Alloys

Safety Data Sheet
Revision Date: 07/27/2020

Vista Metals' SDS Nbr: 011
Date of Issue: 07/27/2020 | Version: 1.0

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters:

Occupational exposure limits:

Copper (7440-50-8)		
USA ACGIH	ACGIH TWA (mg/m ³)	1 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1 mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	1 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	No evidence ["*Effective" IDLH=2,000mg Cu/m ³]
FRANCE	INRS-ED984 (VME) (mg/m ³)	Not Reported
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0.11 mg/m ³ [ceiling 0.21mg/ m ³]
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.2 mg/ m ³
Nickel (7440-02-0)		
USA ACGIH	ACGIH TWA (mg/m ³)	1.5 mg/m ³ – as inhalable fraction
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.015 mg/m ³
USA IDLH	USA IDLH (mg/m ³)	10mg Ni/m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	1mg/m ³ - Notes: C3
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	0,006 A mg/m ³ - Notes 8(11)
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	0.1 mg/m ³
Tin (7440-31-5)		
USA ACGIH	ACGIH TWA (mg/m ³)	2mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	2mg/ m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	2mg/m ³
USA IDLH	USA IDLH (mg/m ³)	100mg/ m ³
FRANCE	INRS-ED984 (VME) (mg/m ³)	0.1mg/m ³
GERMANY	AGW (BAuA-TRGS 900) (VME) (mg/m ³)	---
UK/WEL (workplace exposure limits)	WEL (VME) (mg/m ³)	2mg/m ³

DNEL (Derived No Effect Level):

Copper (7440-50-8)			
Workers	Acute- Systemic Effects	Dermal	273 mg/kg/bw/day
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	1mg/m ³
		Ocular	No hazard identified
	Long-term- Systemic Effects	Dermal	137 mg/kg/bw/day
		Inhalation	No hazard identified
	Long-term- Local Effects	Dermal	No hazard identified
Inhalation		1 mg/m ³	
General Population	Acute- Systemic Effects	Dermal	273 mg/kg/bw/day
		Inhalation	No hazard identified
		Oral	Low hazard [no threshold derived]
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	1mg/m ³
	Long-term- Systemic Effects	Dermal	137 mg/kg/bw/day
		Inhalation	No hazard identified
		Oral	0.041 mg/kg/bw/day
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	1mg/m ³



Copper-Nickel-Tin & Copper-Tin-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 011
 Revision Date: 07/27/2020 Date of Issue: 07/27/2020 | Version: 1.0

Nickel (7440-02-0)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	11.9 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.05mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.05mg Ni/m ³
General Population	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Oral	0.37 mg Ni ion/kgbw/day
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	0.8 mg Ni/m ³
	Long-term- Systemic Effects	Dermal	No hazard identified
		Inhalation	0.00006mg Ni/m ³
		Oral	0.011mg Ni/m ³
	Long-term- Local Effects	Dermal	0.035mg Ni/cm ²
		Inhalation	0.00006mg Ni/m ³

Tin (7440-31-5)			
Workers	Acute- Systemic Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
		Ocular	No hazard identified
	Long-term- Systemic Effects	Dermal	10 mg/kg bw/day
		Inhalation	71mg/m ³
	Long-term- Local Effects	Dermal	No hazard identified
Inhalation		No hazard identified	
General Population	Acute- Systemic Effects	Dermal	No threshold effect
		Inhalation	No hazard identified
		Oral	No hazard identified
	Acute- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified
	Long-term- Systemic Effects	Dermal	80 mg/kg bw/day
		Inhalation	17mg/m ³
		Oral	5 mg/kg bw/day
	Long-term- Local Effects	Dermal	No hazard identified
		Inhalation	No hazard identified

PNEC (Predicted No Effect Concentration):

Copper (7440-50-8)	
Freshwater	7.8 µg/L
Marine Water	5.2 µg/L
Sewage Treatment	230 mg/L
Terrestrial Organisms	65 mg/kg soil dw
Predators (secondary poisoning)	No potential for bioaccumulation



Copper-Nickel-Tin & Copper-Tin-Nickel Alloys

Safety Data Sheet
Revision Date: 07/27/2020

Vista Metals' SDS Nbr: 011
Date of Issue: 07/27/2020 | Version: 1.0

Nickel (7440-02-0)	
Freshwater	7.1 µg/L
Marine Water	8.6 µg/L
Sewage Treatment	0.33 µg/L
Terrestrial Organisms	29.9 mg/kg soil dw
Predators (secondary poisoning)	0.12 mg/kg food

Tin (7440-31-5)	
Freshwater	No hazard identified
Marine Water	No hazard identified
Sewage Treatment	No hazard identified
Terrestrial Organisms	No hazard identified
Predators (secondary poisoning)	No potential for bioaccumulation

8.2 Exposure Controls

Personal Protection measures, such as personal protective equipment:

- Use personal protective equipment that is clean and has been properly maintained.
- Store personal protective equipment in a clean place, away from the work area.
- Never eat, drink or smoke during use. Remove and wash contaminated clothing before re-using.
- Ensure that there is adequate ventilation, especially in confined areas.

Eye/Face Protection:

- Avoid contact with eyes.
- Wearing glasses is recommended- especially before handling powders or dust emission in accordance with standard ANSI A87, EN 166

Hand Protection:

- Wear suitable protective gloves in the event of prolonged or repeated skin contact.
- Gloves must be selected according to the application and during use at the workstation.
- Use gloves that are resistant to chemical agents in accordance to standard EN ISO 374.
- Protective gloves need to be selected according to their suitability for the workstation in question: other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required. Cut-resistant gloves should be in accordance with standard EN 388 & EN 420

Body Protection:

- Avoid skin contact.
- Wear suitable protective clothing.
- Work clothing work by personnel shall be laundered regularly.
- After contact with the product, all parts of the body that have been soiled must be washed.

Respiratory Protection:

- Avoid breathing dust.
- If the ventilation is insufficient, wear appropriate breathing apparatus.
- When workers are confronted with concentrations that are above occupational exposure limits, they must wear a suitable, approved respiratory protection device.
- Wear a mask that is in accordance to category FFP3 standard EN149.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

General information:

Physical State- Solid

Color- Light metallic orange to orange-brown

Important health, safety and environmental information:

pH- not relevant

Boiling Point/Boiling Range- Not specified

Flash point interval- Not relevant

Vapor Pressure- Not relevant



Copper-Nickel-Tin & Copper-Tin-Nickel Alloys

Safety Data Sheet
Revision Date: 07/27/2020

Vista Metals' SDS Nbr: 011
Date of Issue: 07/27/2020 | Version: 1.0

Density- 8.85 g/cm³ (0.32 lbs/in³)

Water Solubility- Insoluble

Melting Point/Melting Range- 1050-1115°C (1920-2065°F)

Self-ignition temperature- Not specified

Decomposition point/decomposition range- Not specified

9.2 Other Information: No data available.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Massive metal is stable and not reactive under normal conditions of use, storage and transport.

10.2 Chemical Stability

This element/mixture is stable under the recommended handling and storage conditions in section 7.

10.3 Possibility of Hazardous Reactions

No data available

10.4 Conditions to Avoid

Formation of dusts and humidity.

10.5 Incompatible Materials

Keep away from: Acids & Strong Oxidizing Agents

10.6 Hazardous Decomposition Products

The thermal decomposition (welding, burning, brazing) may release or form metal oxide fumes.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Inhalation: May cause allergy or asthma symptoms or breathing difficulties. Inhalation or ingestion of dust or fumes can cause respiratory system damage in the event of repeated or prolonged exposure. Suspected human carcinogen.

Skin Contact: Repeated or prolonged contact with the mixture may cause removal of natural oil from the skin resulting in non-allergic contact dermatitis and absorption through the skin.

Eye Contact: Causes serious eye irritation.

Ingestion: If large amounts are ingested, it can cause gastrointestinal irritation. Not an expected route of exposure.

Symptoms related to the physical, chemical and toxicological characteristics: Eye irritation including stinging, tearing, redness, blurred vision and swelling. Difficulty breathing. Dermatitis and rash. If fumes are inhaled, it can cause a flu-like illness known as metal fume fever. Symptoms can be delayed by 4-12 hours and start with sudden onset of thirst combined with a sweet metallic taste in the mouth. Other symptoms include nausea, fever, chills, malaise, headache, vomiting, sweating, excessive urination, coughing, dryness of the mucous membrane, and upper respiratory tract infection.

Acute Toxicity: May cause an allergic skin reaction.

Skin corrosion/irritation: Prolonged contact can cause irritation.

Respiratory Sensitization: May cause breathing difficulty or asthma symptoms.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: Suspected of causing cancer.

Copper (7440-50-8)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Nickel (7440-02-0)	
IARC Monographs, Overall Evaluation of Carcinogenicity	2- Suspected human carcinogen
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Known to be a Human Carcinogen Reasonably anticipated to be a Human Carcinogen



Copper-Nickel-Tin & Copper-Tin-Nickel Alloys

Safety Data Sheet
Revision Date: 07/27/2020

Vista Metals' SDS Nbr: 011
Date of Issue: 07/27/2020 | Version: 1.0

Tin (7440-31-5)	
IARC Monographs, Overall Evaluation of Carcinogenicity	Not Listed
OSHA Specifically Regulated Substances	Not Regulated
OSHA Hazard Communication Carcinogen List	Not Listed
US National Toxicology Program (NTP) Report on Carcinogens	Not Listed

Reproductive Toxicity: Repeated and prolonged exposure to fumes and dust created in processing this product may cause reproductive effects.
Chronic effects: May cause cancer. Is suspected of damaging an unborn child. Nickel can cause a form of dermatitis known as nickel itch and can cause intestinal issues which include irritation.

11.2 Information on Toxicological Effects- Ingredient(s)

Copper (7440-50-8)	
LD50 Oral	472 mg/kg bw
LC50 Inhalation	0.73 mg/L

Nickel (7440-02-0)	
LD50 Oral	>9000 mg/kg/bw
LC50 Inhalation	>10.2mg/L

Tin (7440-31-5)	
LD50 Oral	No information available
LC50 Inhalation	No information available

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Do not flush into water or sewer system. Do not empty into drains. This product contains substances which are hazardous to the environment.

Copper (7440-50-8)	
EC50 Algae	0.0426-0.0535 mg/L (exposure 72h)
LC50 Freshwater Fish	0.15 mg/L (exposure 96h) <i>Oncorhynchus mykiss</i>
LC50 Freshwater Fish	0.8 mg/L (exposure 96h) <i>Cuprinus carpio</i>
EC50 Microorganisms	Not Listed
EC50 Water Flea	0.03 mg/L (exposure 48h) <i>Daphnia magna</i>

Nickel (7440-02-0)	
EC50 Freshwater Algae	0.174 - 0.311 mg/L (exposure 96h) <i>Pseudokirchneriella subcapitata</i>
EC50 Freshwater Algae	=0.18 mg/L (exposure 72h) <i>Pseudokirchneriella subcapitata</i>
LC50 Freshwater Fish	= 10.4mg/L (exposure 96h) <i>Cyprinus carpio</i>
LC50 Freshwater Fish	= 1.3mg/L (exposure 96h) <i>Cyprinus carpio</i>
LC50 Freshwater Fish	>100mg/L (exposure 96h) <i>Brachydanio rerio</i>
EC50 Water Flea	=1mg/L (exposure 48h) <i>Daphnia magna</i>
EC50 Water Flea	>100mg/L (exposure 48h) <i>Daphnia magna</i>

Tin (7440-31-5)	
EC50 Microorganisms	No information available
LC50 Freshwater Fish	No information available
EC50 Water Flea	No information available

12.2 Persistence & Degradability: Insoluble in water.

12.3 Bioaccumulation/Accumulation: Not biodegradable.

12.4 Mobility in soil: Nickel in massive form is not mobile in the environment.



Copper-Nickel-Tin & Copper-Tin-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 011
Revision Date: 07/27/2020 Date of Issue: 07/27/2020 | Version: 1.0

12.5: Results of PBT and vPvB Assessment: This mixture fulfills neither the PBT nor the vPvB criteria for mixtures in accordance with Annex XIII or the REACH regulations according to EC regulation 1907/2006.

12.6 Other adverse effects: Avoid unnecessary release into the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Scrap related to metal processing are recovered materials.

13.1 Waste Treatment Methods:

- Do not pour into drains or waterways. Dispose of in accordance with local regulations.

Waste:

- Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.
- Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector.
- Do not contaminate the ground or water with waste, do not dispose of waste into the environment.

Soiled Packaging:

- Give to a certified disposal contractor.

SECTION 14: TRANSPORTATION INFORMATION

Exempt from transport classification and labeling.

ADR, RID, AND, IATA, IMDG- This product is not covered by international regulations on the transport of dangerous goods.

SECTION 15: REGULATORY INFORMATION

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

Classification and labeling information included in section 2:

The following regulations have been used:

EU Regulation No. 1272/2008 amended by EU Regulation No. 2018/1480 (ATP 13)

Regulation (EC) No 1907/2006 Annex XVII Conditions of restriction: 27

Container information:

None available

Usage restrictions apply to the product: See Annex XVII of EC Regulation No. 1907/2006:

For professional users only

Particular provisions:

In accordance with Article 1.3.4 of Annex I of 1272/2008/CE regulations, metals and alloys in massive form do not require a label. Although classified as hazardous according to criteria of the directive, some of these substances are not hazardous for human health by inhalation, ingestion or skin contact, or hazardous to the aquatic environment in the form in which they are placed on the market.

15.2 US Federal Regulations:

Copper (7440-50-8)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	0.1%

Nickel- Iron Alloy	
SARA Section 311/312 Hazard Classes	Acute & Delayed Health Hazard

Nickel (7440-02-0)	
Listed on the United States TSCA (Toxic Substances Control Act) Inventory- subject to reporting requirements of US SARA Section 313	
CERCLA RQ	100 lb (only applicable if particles are <100µm)
SARA Section 313- Emission Reporting	0.1%

Tin (7440-31-5)	
CERCLA RQ	Not Listed
SARA Section 313- Emission Reporting	Not Listed



Copper-Nickel-Tin & Copper-Tin-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 011
Revision Date: 07/27/2020 Date of Issue: 07/27/2020 | Version: 1.0

15.3 US State Regulations:

Copper (7440-50-8)
US- Pennsylvania-Right to Know Environmental Hazard List
US- Pennsylvania- Right to Know Special Hazardous Substances
US- Pennsylvania- Right to Know List
US- Rhode Island- Right to Know Hazardous Substances List

Nickel (7440-02-0)	
US- California Prop. 65 Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer
US- Massachusetts- Right to Know List	
US- New Jersey- Right to Know Hazardous Substance List	
US- Pennsylvania-Right to Know Environmental Hazard List	
US- Pennsylvania- Right to Know Special Hazardous Substances	
US- Pennsylvania- Right to Know List	
US- Rhode Island- Right to Know Hazardous Substances List	

Tin (7440-31-5)
US- Massachusetts-Right to Know Hazardous Substances List
US- New Jersey- Right to Know List
US- Pennsylvania-Right to Know Environmental Hazard List
US- Pennsylvania- Right to Know Special Hazardous Substances
US- Pennsylvania- Right to Know List
US- Rhode Island- Right to Know Hazardous Substances List

SECTION 16: OTHER INFORMATION

Date of Preparation or Latest Revision: 7/27/2020

Other Information:

Since the user's working conditions are not known by us, the information supplied on this safety data sheet is based on our current level of knowledge and on international, national, and community regulations. The mixture must not be used for other uses than those specified in section 1 without having first obtained written handling instructions. It is at all times the responsibility of the user to take all necessary measures to comply with legal requirements and local regulations. The information in this safety data sheet must be regarded as a description of the safety requirements relating to the mixture and not as a guarantee of the properties thereof.

Vista Metals, Inc believes that the information in this safety data sheet is accurate. However, Vista Metals, Inc makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.



Copper-Nickel-Tin & Copper-Tin-Nickel Alloys

Safety Data Sheet Vista Metals' SDS Nbr: 011
Revision Date: 07/27/2020 Date of Issue: 07/27/2020 | Version: 1.0

Page | 12 of 12

H&P Phrases:

H317- May cause an allergic skin reaction.
H334- May cause allergy or asthma symptoms or breathing difficulties if inhaled
H351- Suspected of causing cancer.
H372- Causes damage to organs through prolonged or repeated exposure.
H373- May cause damage to organs through prolonged or repeated exposure (if inhaled).
P201- Obtain special instructions before use.
P202- Do not handle until all safety precautions have been read and understood.
P260- Do not breathe dust/fume/gas/mist/vapors/spray.
P264- Wash.... Thoroughly after handling.
P270- Do not eat, drink or smoke when using this product.
P272- Contaminated work clothing should not be allowed out of the workplace.
P280- Wear protective gloves/protective clothing/eye protection/face protection
P281- Use personal protective equipment as required.
P302 & P352- IF ON SKIN- Wash with plenty of soap and water.
P308 & P313- IF exposed or concerned: Get medical advice/attention.
P314- Get medical advice/attention if you feel unwell.
P321- Specific treatment (see... on this label)
P333 & P313- If irritation or rash occurs, get medical advice/attention.
P362 & P364- Take off contaminated clothing and wash it before use.
P405- Store locked up.
P273- Avoid release to the environment
P501- Dispose of contents/container in accordance with local/regional/national/international regulations.

Abbreviations:

ACGIH: American Conference of Governmental Industrial Hygienists
ADR: Alternative Dispute Resolution
AGW: Arbeitsplatzgrenzwerte (occupational exposure limits)
CARC 2: Carcinogenicity category 2
CERCLA RQ: Comprehensive Environmental Response, Compensation, and Liability Act Requirements
DGR: Danger
EC50: Half maximal effective concentration
GHS07: Exclamation mark
GHS08: Health Hazard
IATA: International Air Transport Association
IARC: International Agency for Research on Cancer
IDLH: Immediately dangerous to life or health
IMDG: International Maritime Dangerous Goods
INRS: Institute National de la Recherche Scientifique
LC50: Concentration of material in feed or water that is lethal for 50% of exposed population
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PBT: Persistent, bioaccumulate and toxic
PEL: Permissible Exposure Limit
RID: Regulations concerning the International Carriage of Dangerous goods by Rail
SARA: The superfund Amendments and Reauthorization Act
SKIN SENS. 1: Skin sensitivity category 1
STOT RE 1: Specific Target Organ Toxicity Repeated Exposure
SVHC: Substance of Very High Concern
TLV: Threshold Limit Value
vPvB: Very persistent, very bioaccumulate
WEL: Workplace Exposure Limits

END