



## Safety Data Sheet (SDS)

### Section 1 – Identification

- 1(a) Product Identifier used on Label:** Copper Alloys
- 1(b) Other means of identification:**
- 1(c) Recommended use of the chemical and restrictions on use:** Copper alloys product manufacture
- 1(d) Name, address, and telephone number:**  
 ELLWOOD Quality Steels Company Phone number: 724-658-6502  
 700 Moravia Street  
 New Castle, PA 16101
- 1(e) Emergency phone number:** 1-800-424-9300 or CHEMTREC (Day or Night): 1-800-424-9300

### Section 2 – Hazard(s) Identification

**2(a) Classification of the chemical:** Copper Alloys is considered an article under Reach regulation (REACH REGULATION (EC) No 1907/2006) and is not subject to classification under CLP regulation (REGULATION (EC) No 1272/2008). However, **Copper Alloys** is not exempt as an article under OSHA's Hazard Communication Standard (29 CFR 1910.1200) due to its downstream use, thus this product is considered a mixture and a hazardous material. Therefore, the categories of Health Hazards as defined in "GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), Third revised edition ST/SG/AC.10/30/Rev. 3" United Nations, New York and Geneva, 2009 have been evaluated. Refer to Section 3, 8 and 11 for additional information.

**2(b) Signal word, hazard statement(s), symbols and precautionary statement(s):**

Hazard Symbol	Hazard Classification	Signal Word	Hazard Statement(s)
	Respiratory sensitization – 1 Carcinogenicity – 1B Reproductive Toxicity - 2 Single Target Organ Toxicity (STOT) Repeat Exposure - 1	<b>DANGER</b>	Harmful if swallowed. Harmful if inhaled. Causes eye irritation. May cause an allergic skin reaction.
	Acute Toxicity -Oral – 4 Acute Toxicity – Inhalation – 4 Skin Sensitization - 1		May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause cancer. Suspected of damaging fertility or the unborn child.
No Symbol	Eye Irritation – 2B		Causes damage to the respiratory tract through prolonged or repeated exposure if inhaled.

**Precautionary Statement(s):**

Prevention	Response	Storage/Disposal
Avoid breathing or do not breath dusts / fume / gas / mist / vapor / spray. Wear protective gloves / protective clothing / eye protection / face protection. Contaminated work clothing must not be allowed out of the workplace. Use only outdoors or in well ventilated areas. Wash thoroughly after handling. Do not handle until all safety precautions have been read and understood. Do not eat, drink or smoke when using this product Obtain special instructions before use.	If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: call poison center/doctor. If exposed or concerned: Get medical advice/attention or call a poison center/doctor. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. If on skin: Wash with plenty of water. If irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. If swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth.	Store Locked up. Dispose of contents in accordance with federal, state and local regulations.

**2(c) Hazards not otherwise classified:** None Known

**2(d) Unknown acute toxicity statement (mixture):** None Known

### Section 3 – Composition/Information on Ingredients

**3(a-c) Chemical name, common name (synonyms), CAS number and other identifiers, and concentration:**

Chemical Name	CAS Number	EC Number	% weight *
Copper	7440-50-8	231-159-6	40-99
Nickel	7440-02-0	231-111-4	0-40

**Section 3 – Composition/Information on Ingredients (continued)****3(a-c) Chemical name, common name (synonyms), CAS number and other identifiers, and concentration (continued):**

Chemical Name	CAS Number	EC Number	% weight *
Zinc	7440-66-6	231-175-3	0-35
Manganese	7439-96-5	231-105-1	0-35
Chromium	7440-47-3	231-157-5	0-35
Titanium	7440-32-6	236-675-5	0-30
Tin	7440-31-5	231-141-8	0-20
Silver	7440-22-4	231-131-3	0-20
Silicon	7440-21-3	231-130-8	0-20
Niobium (Columbium)	7440-03-1	231-113-5	0-10
Aluminum	7429-90-5	231-072-3	0-10
Iron	7439-89-6	231-096-4	0-5
Cobalt	7440-48-4	231-158-0	0-4
Zirconium	7440-67-7	231-176-9	0-1

EC - European Community

CAS - Chemical Abstract Service

\* Percentages are expressed as typical ranges or maximum concentrations of elements for the purpose of communicating the potential hazards of the finished product.

**Section 4 – First-aid Measures****4(a) Description of necessary measures:**

- **Inhalation:** **Copper Alloys** may form excessive amounts of smoke, fume, or particulate are inhaled during processing, remove to fresh air and consult a qualified health professional.
- **Eye Contact:** **Copper Alloys** may cause particles coming in contact with eyes during processing, treat as with any foreign object.
- **Skin Contact:** **Copper Alloys** may cause skin irritation or allergic reactions, see a physician.
- **Ingestion:** **Copper Alloys** as sold/shipped is not a likely form of exposure.

**4(b) Most important symptoms/effects, acute and delayed (chronic):**

- **Inhalation:** **Copper Alloys** as sold/shipped is not likely to present an acute or chronic health effect.
- **Eye:** **Copper Alloys** as sold/shipped is not likely to present an acute or chronic health effect.
- **Skin:** **Copper Alloys** may cause allergic skin reaction.
- **Ingestion:** **Copper Alloys** may cause acute gastrointestinal effects if swallowed..

However, during further processing (welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes) individual components may illicit an acute or chronic health effect. Refer to Section 11-Toxicological Information.

**4(c) Immediate Medical Attention and Special Treatment:** Treat symptomatically**Section 5 – Fire-fighting Measures**

**5(a) Suitable (and unsuitable) Extinguishing Media:** Not Applicable for **Copper Alloys** as sold/shipped. However, flammable as finely divided particles or pieces resulting from processing of this product. For small fire: Smother with salt (NaCl) or class D dry powder fire extinguisher. For large fire: Isolate fire and allow to burn out. Unsuitable extinguishing media: Do not spray water on burning metal as an explosion may occur. This explosive characteristic is caused by the hydrogen and steam generated by the reaction of water with the burning material.

**5(b) Specific Hazards arising from the chemical:** Intense heat. Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. **WARNING:** Fine particles resulting from grinding, buffing, polishing, or similar processes of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

**5(c) Special protective equipment and precautions for fire-fighters:** Self-contained NIOSH approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Heat and flames cause emittance of acrid smoke and fumes. Do not release runoff from fire control methods to sewers or waterways. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream will scatter and spread flames and, therefore, should not be used.

**Section 6 - Accidental Release Measures**

**6(a) Personal Precautions, Protective Equipment and Emergency Procedures:** Use personal protective equipment as required.

**6(b) Methods and materials for containment and clean up:** Not Applicable for **Copper Alloys** as sold/shipped. Collect material in appropriately labeled containers for recovery or disposal in accordance with federal, state, and local regulations. Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements.



**Section 7 - Handling and Storage**

**7(a) Precautions for safe handling:** Not Applicable for **Copper Alloys** as sold/shipped, however further processing (grinding, buffing, polishing, etc) may ignite spontaneously at room temperature with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. **WARNING:** Fine particles resulting from grinding, buffing, polishing, or similar processes of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard. Avoid breathing metal fumes and/or dust. Do not eat, drink or smoke when using this product. Cut resistant gloves and sleeves should be worn when working with steel products.

**7(b) Conditions for safe storage, including any incompatibilities:** Storage Conditions: Keep chips, turnings, dust, and other small particles away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Incompatible materials: Dissolves in hydrofluoric acid. Ignites in the presence of fluorine. When heated above 200°C, reacts exothermically with the following: Chlorine, bromine, halocarbons, carbon tetrachloride, carbon tetrafluoride, and freon.

**Section 8 - Exposure Controls / Personal Protection**

**8(a) Occupational Exposure Limits (OELs):** **Copper Alloys** as sold/shipped in its physical form does not present an inhalation, ingestion or contact hazard, nor would any of the following exposure data apply. However, operations such as burning, welding (high temperature), sawing, brazing, machining, grinding, etc. may produce fumes and/or particulates. The following exposure limits are offered as reference for an experienced industrial hygienist to review.

Ingredients	OSHA PEL <sup>1</sup>	ACGIH TLV <sup>2</sup>	NIOSH REL <sup>3</sup>	IDLH <sup>4</sup>
Copper	0.1 mg/m <sup>3</sup> (as fume, Cu) 1.0 mg/m <sup>3</sup> (as dusts & mists, Cu)	0.2 mg/m <sup>3</sup> (as fume) 1.0 mg/m <sup>3</sup> (as dusts & mists, Cu)	0.1 mg/m <sup>3</sup> (as fume, Cu) 1.0 mg/m <sup>3</sup> (as dusts & mists, Cu)	100 mg Cu/m <sup>3</sup>
Nickel	1.0 mg/m <sup>3</sup> (metal, insoluble & soluble compounds, as Ni)	1.5 mg/m <sup>3</sup> (metal, as Ni, as inhalable fraction <sup>6</sup> ) 0.2 mg/m <sup>3</sup> (insoluble compounds, as Ni, inhalable fraction, inorganic only) 0.1 mg/m <sup>3</sup> (soluble compounds, as Ni, inhalable fraction, inorganic only)	0.015 mg/m <sup>3</sup> (metal & insoluble and soluble compounds, as Ni)	10 mg/m <sup>3</sup> (as Ni)
Zinc	15 mg/m <sup>3</sup> (as zinc oxide, total dust) 5.0 mg/m <sup>3</sup> (as zinc oxide, respirable fraction & zinc oxide fume)	2.0 mg/m <sup>3</sup> (as zinc oxide, respirable fraction <sup>7</sup> ) “STEL” 10 mg/m <sup>3</sup> (as zinc oxide, respirable fraction)	5.0 mg/m <sup>3</sup> (as zinc oxide dust or fume) “STEL” 10 mg/m <sup>3</sup> (as zinc oxide fume) “C” 15 mg/m <sup>3</sup> (as zinc oxide dust)	500 mg/m <sup>3</sup> (as zinc oxide)
Manganese	“C” 5.0 mg/m <sup>3</sup> (as fume & inorganic compounds, as Mn)	0.02 mg/m <sup>3</sup> (as fume & inorganic compounds, as Mn, respirable fraction) 0.1 mg/m <sup>3</sup> (as fume & inorganic compounds, as Mn, inhalable fraction)	1.0 mg/m <sup>3</sup> (as fume & inorganic compounds, as Mn) “STEL” 3.0 mg/m <sup>3</sup> (as fume & inorganic compounds, as Mn)	500 mg/m <sup>3</sup> (as Mn)
Chromium	0.5 mg/m <sup>3</sup> (as Cr II & III, inorganic compounds) 1.0 mg/m <sup>3</sup> (as Cr, metal) 0.005 mg/m <sup>3</sup> (as Cr VI, inorganic compounds, water soluble & insoluble) “AL” 0.0025 mg/m <sup>3</sup> (as Cr VI, inorganic compounds, water soluble & insoluble)	0.003 mg/m <sup>3</sup> (as Cr III, inorganic compounds, inhalable fraction <sup>5</sup> ) “DSEN & RSEN” “water-soluble” compounds only 0.5 mg/m <sup>3</sup> (as Cr, metal, inhalable fraction) 0.0002 mg/m <sup>3</sup> (as Cr VI, inorganic compounds, water insoluble & insoluble) “DSEN & RSEN” “STEL” 0.0005 mg/m <sup>3</sup> (as Cr VI, inorganic compounds, water insoluble & insoluble) “DSEN & RSEN”	0.5 mg/m <sup>3</sup> (as Cr II & III, inorganic compounds & metal) 0.0002 mg/m <sup>3</sup> (as Cr VI, inorganic compounds, water insoluble & insoluble)	250 mg/m <sup>3</sup> (as Cr II & metal) 25 mg/m <sup>3</sup> (as Cr III) 15 mg/m <sup>3</sup> (as Cr VI, Ca)
Titanium	15 mg/m <sup>3</sup> (as titanium dioxide, total dust)	0.2 mg/m <sup>3</sup> (as respirable fraction, finescale particle) 2.5 mg/m <sup>3</sup> ( as respirable fraction, nanoscale particle)	Quantitative REL <sup>7</sup>	5,000 mg/m <sup>3</sup> (as TiO <sub>2</sub> )
Tin	2.0 mg/m <sup>3</sup> (metal & inorganic compounds, as Sn, except oxides) 0.1 mg/m <sup>3</sup> (organic compounds, as Sn)	2.0 mg/m <sup>3</sup> (metal, oxides & inorganic compounds, as Sn) 0.1 mg/m <sup>3</sup> (organic compounds, as Sn) “STEL” 0.2 mg/m <sup>3</sup> (organic compounds, as Sn)	2.0 mg/m <sup>3</sup> (metal & inorganic compounds, as Sn, except oxides) 0.1 mg/m <sup>3</sup> (organic compounds, as Sn, except Cyhexatin) 2.0 mg/m <sup>3</sup> (tin oxides, as Sn)	100 mg/m <sup>3</sup> (inorganic compounds, as Sn) 25 mg/m <sup>3</sup> (organic compounds, as Sn)
Silver	0.01 mg/m <sup>3</sup> (metal & soluble compounds, as Ag)	0.01 mg/m <sup>3</sup> (soluble compounds, as Ag) 0.1 mg/m <sup>3</sup> (metal dust & fume, as Ag)	0.01 mg/m <sup>3</sup> (metal & soluble compounds, as Ag)	10 mg/m <sup>3</sup> (as Ag)
Silicon	15 mg/m <sup>3</sup> (total dust) 5.0 mg/m <sup>3</sup> (as respirable fraction)	NE	10 mg/m <sup>3</sup> (as total dust) 5.0 mg/m <sup>3</sup> (as respirable dust)	NE
Niobium (Columbium)	NE	NE	NE	NE



Section 8 - Exposure Controls / Personal Protection (continued)

8(a) Occupational Exposure Limits (OELs): (continued)

Ingredients	OSHA PEL <sup>1</sup>	ACGIH TLV <sup>2</sup>	NIOSH REL <sup>3</sup>	IDLH <sup>4</sup>
Aluminum	15 mg/m <sup>3</sup> (as aluminum oxide, metal & insoluble compounds, total dust) 5.0 mg/m <sup>3</sup> (as aluminum oxide, metal & insoluble compounds, respirable fraction)	1.0 mg/m <sup>3</sup> (as metal & insoluble compounds, respirable fraction <sup>6</sup> )	10 mg/m <sup>3</sup> (as metal & insoluble compounds, total dust) 5.0 mg/m <sup>3</sup> (as metal & insoluble compounds, respirable fraction) 5.0 mg/m <sup>3</sup> (as welding fumes & pyro powders)	NE
Iron	10 mg/m <sup>3</sup> (iron oxide fume)	5.0 mg/m <sup>3</sup> (iron oxide, respirable fraction)	5.0 mg/m <sup>3</sup> (iron oxide dust and fume, as Fe)	2,500 mg/m <sup>3</sup> (as Fe)
Cobalt	0.1 mg/m <sup>3</sup> (metal dust & fume, as Co)	0.02 mg/m <sup>3</sup> (as inhalable fraction of aerosol)	0.05 mg/m <sup>3</sup> (metal dust & fume, as Co)	20 mg/m <sup>3</sup> (as Co)
Zirconium	5.0 mg/m <sup>3</sup> (zirconium compounds, soluble compounds, as Zr)	5.0 mg/m <sup>3</sup> (elemental, zirconium compounds, soluble compounds, as Zr) “STEL” 10 mg/m <sup>3</sup> (elemental, zirconium compounds, soluble compounds, as Zr)	5.0 mg/m <sup>3</sup> (elemental, zirconium compounds, soluble compounds, as Zr) “STEL” 10 mg/m <sup>3</sup> (elemental, zirconium compounds, soluble compounds, as Zr)	50 mg/m <sup>3</sup> (as Zr)

NE - None Established

1. OSHA PELs (Permissible Exposure Limits) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted. A (“C”) designation denotes a ceiling limit, which should not be exceeded during any part of the working exposure unless otherwise noted. A Short Term Exposure Limit (STEL) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday. An Action level (AL) is used by OSHA and NIOSH to express a health or physical hazard. They indicate the level of a harmful or toxic substance/activity, which requires medical surveillance, increased industrial hygiene monitoring, or biological monitoring. Action Levels are generally set at one half of the PEL but the actual level may vary from standard to standard. The intent is to identify a level at which the vast majority of randomly sampled exposures will be below the PEL.
2. Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. ACGIH TLVs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes. DSEN – May cause dermal sensitization. This notation is used to indicate the potential for dermal sensitization resulting from the interaction of an absorbed agent and ultraviolet light (i.e. photosensitization). RSEN – May cause respiratory sensitization.
3. The National Institute for Occupational Safety and Health Recommended Exposure Limits (NIOSH-REL)- Compendium of Policy and Statements. NIOSH, Cincinnati, OH (1992). NIOSH is the federal agency designated to conduct research relative to occupational safety and health. As is the case with ACGIH TLVs, NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
4. The “immediately dangerous to life or health air concentration values (IDLHs)” are used by NIOSH as part of the respirator selection criteria and were first developed in the mid-1970’s by NIOSH. The Documentation for Immediately Dangerous to Life or Health Concentrations (IDLHs) is a compilation of the rationale and sources of information used by NIOSH during the original determination of 387 IDLHs and their subsequent review and revision in 1994. Ca is designated as carcinogen.
5. Inhalable fraction. The concentration of inhalable particulate for the application of this TLV is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH 2024 TLVs<sup>®</sup> and BEIs<sup>®</sup> (Biological Exposure Indices) Appendix D, paragraph A.
6. Respirable fraction. The concentration of respirable dust for the application of this limit is to be determined from the fraction passing a size-selector with the characteristics defined in ACGIH 2024 TLVs<sup>®</sup> and BEIs<sup>®</sup> Appendix D, paragraph C.
7. Quantitative REL Refer to NIOSH pocket guide App A, Toxicological Information.

8(b) Appropriate Engineering Controls: Use controls as appropriate to minimize exposure to metal fumes and dusts during handling operations. Provide general or local exhaust ventilation systems to minimize airborne concentrations. Local exhaust is necessary for use in enclosed or confined spaces. Provide sufficient general/local exhaust ventilation in pattern/volume to control inhalation exposures below current exposure limits.

8(c) Individual Protection Measures:

- Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use only a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Concentration in air of the various contaminants determines the extent of respiratory protection needed. Half-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 10 times the exposure limit. Full-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 50 times the exposure limit. Protection by air-purifying negative-pressure and powered air respirators is limited. Use a positive-pressure-demand, full-face, supplied air respirator or self-contained breathing apparatus (SCBA) for concentrations above 50 times the exposure limit. If exposure is above the IDLH (Immediately dangerous to life or health) for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-demand, full-face, supplied air respirator with escape bottle or SCBA.

Warning! Air-purifying respirators both negative-pressure and powered-air do not protect workers in oxygen-deficient atmospheres.

- Eyes: Wear appropriate eye protection to prevent eye contact. For operations which result in elevating the temperature of the product to or above its melting point or result in the generation of airborne particulates, use safety glasses to prevent eye contact. Contact lenses should not be worn where industrial exposure to this material are likely. Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations.
- Skin: Wear appropriate personal protective clothing to prevent skin contact. Cut-resistant gloves and/or protective clothing may be appropriate when sharp surfaces are present. For operations which result in elevating the temperature of the product to or above its melting point or result in the generation of airborne particulates, use fire/flame resistant/retardant clothing during hot work with Copper Alloys, and gloves to prevent skin contact. Protective gloves should be worn as required for welding, burning or handling operations. Contaminated work clothing must not be allowed out of the workplace.
- Other protective equipment: An eyewash fountain and deluge shower should be readily available in the work area.

**Section 9 - Physical and Chemical Properties**

**9(a) Appearance (physical state, color, etc.):** Solid, Metallic Silver Gray, Various massive product forms

**9(b) Odor:** Odorless

**9(c) Odor Threshold:** NA

**9(d) pH:** NA

**9(e) Melting Point/Freezing Point:** 1600 - 2400 °F (871 - 1315 °C)

**9(f) Initial Boiling Point and Boiling Range:** NA

**9(g) Flash Point:** NA

**9(h) Evaporation Rate:** NA

**9(i) Flammability (solid, gas):** Non-flammable, non-combustible (for solid castings as distributed, however flammable as finely divided particles resulting from processing)

NA - Not Applicable

ND - Not Determined for product as a whole

**9(j) Upper/lower Flammability or Explosive Limits:**

**9(k) Vapor Pressure:** NA

**9(l) Vapor Density (Air = 1):** NA

**9(m) Relative Density:** 4-10 g/cm<sup>3</sup>

**9(n) Solubility(ies):** Insoluble

**9(o) Coefficient (water/oil distribution):** NA

**9(p) Auto-ignition Temperature:** NA

**9(q) Decomposition Temperature:** NA

**9(r) Viscosity:** NA

**Section 10 - Stability and Reactivity**

**10(a) Reactivity:** Not Determined (ND) for product in a solid form.

**10(b) Chemical Stability:** Stable under normal storage and handling conditions.

**10(c) Possibility of hazardous reaction:** None under normal processing. Hazardous polymerization will not occur.

**10(d) Conditions to Avoid:** Dust formation and dust accumulation. Sparks, heat, open flame and other sources of ignition.

**10(e) Incompatible Materials:** When molten - water. Strong acids, strong bases, strong oxidizers. Alkalis. Metal oxides. Moisture. Corrosive substances in contact with metals may produce flammable hydrogen gas.

**10(f) Hazardous Decomposition Products:** Metallic oxides. When product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated.

**Section 11 - Toxicological Information**

**11 Information on toxicological effects:** Copper Alloys as sold/shipped in its physical form does not present an inhalation, ingestion or contact hazard, nor would any of the following exposure data apply. However, operations such as burning, welding (high temperature), sawing, brazing, machining, grinding, etc. may produce fumes and/or particulates. The following exposure limits are offered as reference for an experienced industrial hygienist to review.

Hazard Classification	Hazard Category		Hazard Symbols	Signal Word	Hazard Statement
	EU	OSHA			
Acute Toxicity Hazard-Oral (covers Categories 1-4)	NA*	4 <sup>a</sup>		Warning	Harmful if swallowed- Rating due to iron and cobalt particulate generated from further processing (welding, grinding, burning, etc.).
Acute Toxicity Hazard-Inhalation (covers Categories 4)	NA*	4		Warning	Harmful if inhaled-- Rating due to cobalt particulate generated from further processing (welding, grinding, burning, etc.).
Eye Irritation (covers Category 2B)	NA*	2B	No Symbol	Warning	Cuses Eye Irritation
Skin/Dermal Sensitization (covers Category 1, 1A and 1B)	NA*	1 <sup>d</sup>		Warning	May cause an allergic skin reaction - Nickel and cobalt are skin sensitizers.
Respiratory sensitization (covers category 1, 1A and 1B)	NA*	1 <sup>e</sup>		Danger	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Carcinogenicity (covers Categories 1A, 1B and 2)	NA*	1B <sup>g</sup>		Danger	May cause cancer (welding, grinding, burning, etc)
Toxic Reproduction (covers Categories 1A, 1B and 2)	NA*	2 <sup>h</sup>		Warning	Suspected of damaging fertility or the unborn child. - Rating due to nickel particulate or fume that can enter the body generated when further processed (welding, grinding, burning, etc.).
STOT following Repeated Exposure (covers Categories 1 and 2)	NA*	1 <sup>j</sup>		Danger	Causes damage to lungs and central nervous system through prolonged or repeated inhalation exposure. Rating due to nickel, copper, or manganese particulate or fume that can enter the body generated when further processed (welding, grinding, burning, etc.).

\* Not Applicable – Metal alloy products are considered articles under Reach regulation (REACH REGULATION (EC) No 1907/2006) and are not subject to classification under CLP regulation (REGULATION (EC) No 1272/2008).

**Section 11 - Toxicological Information (continued)****11 Information on toxicological effects (continued)**

Toxicological data listed below are presented regardless to classification criteria. Individual hazard classification categories where the toxicological information has met or exceeded a classification criteria threshold are listed above.

a. No LC<sub>50</sub> or LD<sub>50</sub> has been established for **Copper Alloys**. The following data has been determined for the components:

- **Nickel:** Rat LD<sub>50</sub> => 9000 mg/kg (REACH)  
Rat NOAEC > 10.2 mg/L (REACH)
- **Iron:** Rat LD<sub>50</sub> =98.6 g/kg (REACH)  
Rat LD<sub>50</sub> =1060 mg/kg (IUCLID)  
Rat LD<sub>50</sub> =984 mg/kg (IUCLID)  
Rabbit LD<sub>50</sub> =890 mg/kg (IUCLID)  
Guinea Pig LD<sub>50</sub> =20 g/kg (TOXNET)
- **Titanium:** Rat LD<sub>50</sub> > 5000 mg/kg (dioxotitanium)  
Rat LD<sub>50</sub> > 11000 mg/kg (dioxotitanium)  
Rat LD<sub>50</sub> > 25000 mg/kg (dioxotitanium)
- **Zirconium:** Rat LD<sub>50</sub> >5000 mg/kg (powder)  
Rat LD<sub>50</sub> > 9000 mg/kg (NLM Toxnet)
- **Cobalt :** Rat LD<sub>50</sub> = 6171 mg/kg  
Rabbit LD<sub>50</sub> = 750 mg/kg (TOXNET)  
Rat LD<sub>50</sub> = 550 mg/kg  
Rat LD<sub>50</sub> = 7510 mg/kg (REACH)  
Rat LD<sub>50</sub> > 7000 mg/kg (IUCLID)
- **Copper:** Rat LD<sub>50</sub> = 481 mg/kg (REACH)  
Rat LD<sub>50</sub> > 2500 mg/kg (REACH)
- **Manganese:** Rat LD<sub>50</sub> > 2000 mg/kg (REACH)  
Rat LD<sub>50</sub> > 9000 mg/kg (NLM Toxnet)
- **Silicon:** LD<sub>50</sub> = 3160 mg/kg (Oral/Rat)
- **Columbium:** Rat LD<sub>50</sub> >2000 mg/kg (REACH)  
Rat LD<sub>50</sub> >10000 mg/kg  
Mouse LD<sub>50</sub> >10000 mg/kg (Toxnet)
- **Aluminum:** Rat LD<sub>50</sub> > 15.9 g/kg (REACH)

b. No Skin (Dermal) Irritation data available for **Copper Alloys** as a mixture. The following skin irritation information was found for the components:

- **Iron Oxide:** Moderately irritating.

c. No Eye Irritation data available for **Copper Alloys** as a mixture. The following eye irritation information was found for the components:

- **Iron:** Causes eye irritation.
- **Nickel:** Slight eye irritation from particulate abrasion only.
- **Silicon:** Slight eye irritation in rabbit protocol.

d. No Skin (Dermal) Sensitization data available for **Copper Alloys** as a mixture. The following eye irritation information was found for the components:

- **Nickel:** May cause allergic skin sensitization.

e. No Respiratory Sensitization data available for **Copper Alloys** as a mixture. The following eye irritation information was found for the components:

f. No Germ Cell Mutagenicity data available for **Copper Alloys** as a mixture. The following eye irritation information was found for the components:

- **Iron:** IUCLID has found some positive and negative findings in vitro.
- **Nickel:** EU RAR has found positive results in vitro and in vivo but insufficient data for classification.
- **Aluminum:** IUCLID; ATSDR have found this ingredient is not mutagenic *in vitro*; but has marginal effects *in vivo*.

g. Carcinogenicity: IARC, NTP, and OSHA do not list **Copper Alloys** as carcinogens. The following Carcinogenicity information was found for the components:

- **Copper (dust, mist, fume, inorganic compounds, as Cu):** EPA-D, not classifiable as to human carcinogenicity (CBD, cannot be determined)
- **Chromium (as metal):** IARC-3, unclassifiable as to carcinogenicity in humans; EPA-A, human carcinogen (inhalation), EPA-K, known human carcinogen (inhalation), EPA-D, not classifiable as a human carcinogen (oral), EPA-CBD, cannot be determined (oral)
- **Chromium (as trivalent chromium III, inorganic compounds):** IARC-3 (organic & inorganic compounds), unclassifiable as to carcinogenicity in humans; ACGIH TLV-A4, not classifiable as a human carcinogen; EPA-D, not classifiable as to human carcinogenicity (CBD, cannot be determined)
- **Chromium (hexavalent, VI, inorganic water-soluble & & soluble compounds):** IARC-1, carcinogen to humans; ACGIH TLV-A1, confirmed human carcinogen; NIOSH-Ca, potential occupational carcinogen; NTP-K, known to be a carcinogen; EPA-A, human carcinogen (inhalation), EPA-K, known human carcinogen (inhalation), EPA-D, not classifiable as a human carcinogen (oral), EPA-CBD, cannot be determined (oral)
- **Iron Oxide (Fe<sub>2</sub>O<sub>3</sub>):** IARC-3, unclassifiable as to carcinogenicity in humans; ACGIH TLV-A4, not classifiable as a human carcinogen
- **Manganese (inorganic compounds, as Mn):** ACGIH TLV-A4, not classifiable as a human carcinogen; EPA-D, not classifiable as to human carcinogenicity
- **Manganese (fume, as Mn):** ACGIH TLV-A4, not classifiable as a human carcinogen; EPA-D, not classifiable as to human carcinogenicity
- **Nickel, alloys:** IARC-2B, possibly carcinogenic to humans
- **Nickel compounds:** IARC-1, carcinogen to humans; NIOSH-Ca, potential occupational carcinogen; NTP-K, known to be a carcinogen
- **Nickel, elemental:** IARC-2B, possibly carcinogenic to humans; NIOSH-Ca, potential occupational carcinogen; NTP-K, known to be a carcinogen; ACGIH TLV-A5, not suspected as a human carcinogen
- **Nickel, insoluble compounds (as Ni):** NIOSH-Ca, potential occupational carcinogen; NTP-K, known to be a carcinogen; ACGIH TLV-A1, confirmed human carcinogen
- **Cobalt:** IARC-2B, possibly carcinogenic to humans; ACGIH TLV-A3 (inorganic compounds), confirmed animal carcinogen with unknown relevance to humans; NTP-R (that releases cobalt ions in vivo), reasonably anticipated to be a human carcinogen (RAHC)
- **Silver:** EPA-D, not classifiable as to human carcinogenicity (CBD, cannot be determined)

## Section 11 - Toxicological Information (continued)

**11 Information on toxicological effects (continued):**

## g. Carcinogenicity (continued)

- **Tin:** ACGIH TLV-A4, not classifiable as a human carcinogen
- **Titanium (as titanium Dioxide):** IARC-2B, possibly carcinogenic to humans; ACGIH TLV-A3, confirmed animal carcinogen with unknown relevance to humans; NIOSH-Ca, potential occupational carcinogen
- **Zinc (oxide):** EPA-II, inadequate information to assess carcinogenic potential & EPA-D not classifiable as to human carcinogenicity & EPA-I, data are inadequate for assessment of human carcinogenic potential
- **Zinc (oxide, fume):** EPA-II, inadequate information to assess carcinogenic potential; EPA-D, not classifiable as to human carcinogenicity & EPA-I, Data are Inadequate for an Assessment of Human Carcinogenic Potential
- **Zirconium (elemental & compounds):** ACGIH TLV-A4, not classifiable as a human carcinogen
- **Aluminum (metal and insoluble compounds):** IARC-1 (production), carcinogen to humans; ACGIH TLV-A4, not classifiable as a human carcinogen
- **Welding Fumes (not otherwise specified):** IARC-1, carcinogen to humans; NIOSH-Ca, potential occupational carcinogen

h. No Toxic Reproduction data available for **Copper Alloys** as a mixture. The following eye irritation information was found for the components:

- **Nickel:** Effects on fertility

i. No Specific Target Organ Toxicity (STOT) following Single Exposure data available for **Copper Alloys** as a mixture. The following STOT following single exposure information was found for the components:

- **Iron:** Irritating to respiratory tract.
- **Aluminum:** Repeated exposure associated with Asthma, fibrosis in lungs and encephalopathy in humans.

j. No Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available for **Copper Alloys** as a mixture. The following STOT following Repeated Exposure data was found for the components:

- **Nickel:** Rat 4 wk inhalation LOEL 4 mg/m<sup>3</sup> Lung and Lymph node histopathology. Rat 2 yr inhalation LOEL 0.1 mg/m<sup>3</sup> Pigment in kidney, effects on hematopoiesis spleen and bone marrow and adrenal tumor. Rat 13 Week Inhalation LOAEC 1.0 mg/m<sup>3</sup> Lung weights, and Alveolar histopathology.
- **Manganese:** Inhalation of metal fumes - Degenerative changes in human Brain; Behavioral: Changes in motor activity and muscle weakness (Whitlock *et al.*, 1966).
- **Copper:** Target organs affected - Skin, eyes liver, kidneys and respiratory tract.
- **Aluminum:** Reviews have found chronic exposure to aluminum flake has been reported to cause pneumoconiosis in workers. Repeat oral exposure to aluminum results in decrements in neurobehavioral function and development.

The above toxicity information was determined from available scientific sources to illustrate the prevailing posture of the scientific community. The scientific resources includes: The American Conference of Governmental Industrial Hygienist (ACGIH) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure indices (BEIs) with Other Worldwide Occupational Exposure Values 2024, The International Agency for Research on Cancer (IARC), The National Toxicology Program (NTP) updated documentation, the World Health Organization (WHO) and other available resources, the International Uniform Chemical Information Database (IUCLID), European Union Risk Assessment Report (EU-RAR), Concise International Chemical Assessment Documents (CICAD), European Union Scientific Committee for Occupational Exposure Limits (EU-SCOEL), Agency for Toxic Substances and Disease Registry (ATSDR), Hazardous Substance Data Bank (HSDB), and International Programme on Chemical Safety (IPCS), European Union Classification, Labeling and Packaging. (EU CPL), Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), International Uniform Chemical Information Database (IUCLID), TOXicology Data NETwork (TOXNET), European Risk Assessment Reports (EU RAR).

The following health hazard information is provided regardless to classification criteria and is based on the individual component(s) and potential resultant components from further processing:

**Acute Effects:**

- **Inhalation:** Excessive exposure to high concentrations of metal dust may cause irritation to the eyes, skin and mucous membranes of the upper respiratory tract. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Excessive inhalation of fumes of freshly formed metal oxide particles sized below 1.5 micrometer and usually between 0.02-0.05 micrometers from many metals can produce an acute reaction known as "metal fume fever". Symptoms consist of chills and fever (very similar to and easily confused with flu symptoms), metallic taste in the mouth, dryness and irritation of the throat followed by weakness and muscle pain. The symptoms come on in a few hours after excessive exposure and usually last from 12 to 48 hours. Long-term effects from metal fume fever have not been noted. Freshly formed oxide fumes of manganese and copper have been associated with causing metal fume fever.
- **Eye:** Excessive exposure to high concentrations of metal dust may cause irritation to the eyes.
- **Skin:** Skin contact with metal dusts may cause irritation or sensitization, possibly leading to dermatitis. Skin contact with metallic fumes and dusts may cause physical abrasion.
- **Ingestion:** Ingestion of harmful amounts of this product as distributed is unlikely due to its solid insoluble form. Ingestion of metal dust may cause nausea or vomiting.

**Acute Effects by component:**

- **Chromium, chromium oxides and hexavalent chrome:** Hexavalent chrome causes damage to gastrointestinal tract, lung, severe skin burns and eye damage, serious eye damage, skin contact may cause an allergic skin reaction. Inhalation may cause allergic or asthmatic symptoms or breathing difficulties.
- **Copper and copper oxides:** Copper may cause allergic skin reaction. Copper oxide is harmful if swallowed, causes skin and eye irritation, and may cause an allergic skin reaction.
- **Iron and iron oxides:** Iron is harmful if swallowed, causes skin irritation, and causes eye irritation. Contact with iron oxide has been reported to cause skin irritation and serious eye damage. Particles of iron or iron compounds, which become imbedded in the eye, may cause rust stains unless removed fairly promptly.
- **Manganese and manganese oxides:** Manganese and Manganese oxide are harmful if swallowed.
- **Nickel and nickel oxides:** Nickel may cause allergic skin sensitization. Nickel oxide may cause an allergic skin.

**Section 11 - Toxicological Information (continued)****11 Information on toxicological effects (continued):****Acute Effects by component (continued):**

- **Cobalt:** Cobalt-containing powders may be fatal if inhaled
- **Silicon and silicon oxides:** May be harmful if swallowed.
- **Tin:** Not Reported/ Not Classified
- **Columbium (Niobium):** Columbium may cause skin irritation.
- **Titanium:** Not Reported / Not Classified
- **Zinc and zinc oxides:** Not Reported/ Not Classified
- **Aluminum and aluminum oxides:** Not Reported/ Not Classified
- **Zirconium and zirconium oxides:** Zirconium *per se* has not been shown an irritant to skin and eyes but metal dust in eyes may result in a mechanical irritation. While no adverse toxicology has been reported at this time, respiration and eye contact of these dusts should be minimized by appropriate workplace measures.

**Delayed (chronic) Effects by component:**

- **Copper and copper oxides:** Inhalation of high concentrations of freshly formed oxide fumes and dusts of copper can cause metal fume fever. Chronic inhalation of copper dust has caused, in animals, hemolysis of the red blood cells, deposition of hemofuscin in the liver and pancreas, injury to lung cells and gastrointestinal symptoms.
- **Iron and iron oxides:** Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in the development of a benign pneumoconiosis, called siderosis, which is observable as an X-ray change. No physical impairment of lung function has been associated with siderosis. Inhalation of excessive concentrations of ferric oxide may enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.
- **Cobalt:** Cobalt-containing alloys may cause sensitization by inhalation
- **Nickel and nickel oxides:** Exposure to nickel dusts and fumes can cause sensitization dermatitis, respiratory irritation, asthma, pulmonary fibrosis, edema, and may cause nasal or lung cancer in humans. Nickel causes damage to lungs through prolonged or repeated inhalation exposure. Nickel is suspected of damaging the unborn child.
- **Chromium, chromium oxides and hexavalent chromium:** The health hazards associated with exposure to chromium are dependent upon its oxidation state. The metal form (chromium as it exists in this product) is of very low toxicity. The hexavalent form is very toxic. Repeated or prolonged exposure to hexavalent chromium compounds may cause respiratory irritation, nosebleed, ulceration and perforation of the nasal septum. Industrial exposure to certain forms of hexavalent chromium has been related to an increased incidence of cancer. Hexavalent chromium may cause genetic defects and is suspected of damaging the unborn child. Developmental toxicity in the mouse, suspected of damaging fertility or the unborn child.
- **Manganese and manganese oxides:** Chronic exposure to high concentrations of manganese fumes and dusts may adversely affect the central nervous system with symptoms including languor, sleepiness, weakness, emotional disturbances, spastic gait, mask-like facial expression and paralysis. Animal studies indicate that manganese exposure may increase susceptibility to bacterial and viral infections. Occupational overexposure (Manganese) is a progressive, disabling neurological syndrome that typically begins with relatively mild symptoms and evolves to include altered gait, fine tremor, and sometimes, psychiatric disturbances. May cause damage to lungs with repeated or prolonged exposure. Neurobehavioral alterations in worker populations exposed to manganese oxides include: speed and coordination of motor function are especially impaired.
- **Silicon and silicon oxides:** Silicon dusts are a low health risk by inhalation and should be treated as a nuisance dust. Eye contact with pure material can cause particulate irritation. Skin contact with silicon dusts may cause physical abrasion.
- **Tin:** No systemic effects have been reported from industrial exposure to tin. Occupational exposures to tin can cause a benign pneumoconiosis termed 'stannosis'. No cases of massive fibrosis from over-exposure to tin have been reported.
- **Columbium (Niobium):** No reports of human intoxication. There is no evidence of a human health hazard due to inhalation. Can cause eye and skin irritation.
- **Titanium:** Titanium Oxide accumulates in the lungs – and over time mostly in alveoli and macrophages. Exposure by inhalation route should be reduced to lowest levels to reduce accumulation in lungs. This accumulation is apparently responsible for carcinogenesis in rats only (no such response in mouse or hamster).
- **Zinc and zinc oxides:** Zinc dusts are a low health risk by inhalation and should be treated as a nuisance dust. Inhalation of zinc oxide fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.
- **Zirconium and zirconium oxides:** Zirconium metal dusts will accumulate in lungs on repeated dosing.
- **Aluminum and Aluminum oxides:** Chronic inhalation of finely divided powder has been reported to cause pulmonary fibrosis and emphysema. Repeated skin contact has been associated with bleeding into the tissue, delayed hypersensitivity and granulomas. Chronic exposure to aluminum flake has been reported to cause pneumoconiosis in workers. Repeat oral exposure to aluminum results in decrements in neurobehavioral function and development.

**Section 12 - Ecological Information**

**12(a) Ecotoxicity (aquatic & terrestrial):** No Data Available for **Copper Alloys** as sold/shipped. However, individual components of the product when processed have been found to be toxic to the environment.

- **Nickel:** 96 h-LC<sub>50</sub> = 15.3 mg/L Fish
- **Iron Oxide:** LC<sub>50</sub>: >1000 mg/L; Fish 48 h-EC<sub>50</sub> > 100 mg/L (Currenta, 2008k); 96 h-LC<sub>50</sub> ≥ 50,000 mg/L Test substance: Bayferrox 130 red (95 – 97% Fe<sub>2</sub>O<sub>3</sub>; < 4% SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub>) (Bayer, 1989a).
- **Cobalt:** 96 h-LC<sub>50</sub> = 1.5mg Co/L for *Oncorhynchus mykiss* to 85 mg Co/L for *Danio rerio* mg/L
- **Manganese:** 96 h-LC<sub>50</sub> = 3.6 mg Co/L for *Oncorhynchus mykiss*
- **Alumium:** 96 h-LC<sub>50</sub> = 7.4 mg Co/L for *Oncorhynchus mykiss* at a pH. Of 6.5 and 14.6 mg at the pH of 7.5





Section 12 - Ecological Information (continued)

12(b) Persistence & Degradability: No Data Available for Copper Alloys as sold/shipped or individual components.

12(c) Bioaccumulative Potential: No Data Available for Copper Alloys as sold/shipped or individual components.

12(d) Mobility (in soil): No data available for Copper Alloys as sold/shipped. However, individual components of the product have been found to be absorbed by plants from soil.

12(e) Other adverse effects: Copper Alloys as shipped is not classified for acute environmental endpoints. However, when subjected to sawing or grinding, particles may be generated that are classified for aquatic acute toxicity.

Additional Information:

Hazard Category: Aquatic Toxicity – Acute – 1
Aquatic Toxicity – Chronic– 1

Signal Word: No Signal Word

Hazard Symbol: [GHS09 symbol]

Hazard Statement: Very toxic to aquatic life with long lasting effects. Avoid release in environment. Collect spillage.

Section 13 - Disposal Considerations

Disposal: Dispose of in accordance with Local, State, Federal and International regulations. Observe safe handling precautions.

Container Cleaning and Disposal: Follow Local, State, Federal and International regulations. Observe safe handling precautions

Please note this information is for Copper Alloys in its original form. Any alterations can void this information.

Section 14 - Transport Information

14 (a-g) Transportation Information:

US Department of Transportation (DOT) under 49 CFR 172.101 does not regulate Copper Alloys as a hazardous material. All federal, state, and local laws and regulations that apply to the transport of this type of material must be adhered to.

Section 15 - Regulatory Information

Regulatory Information: The following listing of regulations relating to an ELLWOOD Quality Steel Company product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.

This product and/or its constituents are subject to the following regulations:

OSHA Regulations: Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-2, Z-3): The product, Copper Alloys as a whole is not listed. However, individual components of the product are listed: Refer to Section 8, Exposure Controls and Personal Protection.

EPA Regulations: The product, Copper Alloys is not listed as a whole. However, individual components of the product are listed:

Table with 2 columns: Components, Regulations. Lists elements like Chromium, Copper, Iron, Manganese, Nickel, Cobalt, Aluminum, Titanium, Zinc, Silver, Tin and their corresponding regulations (CERCLA, CWA, SARA 313, TSCA, SDWA).

SARA 311/312 Potential Hazard Categories: Immediate Acute Health Hazard; Delayed Chronic Health Hazard

Section 313 Supplier Notification: The product, Copper Alloys contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-to-Know Act and 40 CFR part 372:

Table with 3 columns: CAS #, Chemical Name, Percent by Weight. Lists chemicals like Nickel, Copper, Cobalt, Chromium, Manganese, Cobalt, Aluminum with their respective CAS numbers and percentages.

**Section 15 - Regulatory Information (continued)**

**EPA Regulations (continued):**

**Section 313 Supplier Notification (continued):**

CAS #	Chemical Name	Percent by Weight
7440-66-6	Zinc	0-35
7440-22-4	Silver	0-20

**Regulations Key:**

- CAA Clean Air Act (42 USC Sec. 7412; 40 CFR Part 61 [As of: 8/18/06])
- CERCLA Comprehensive Environmental Response, Compensation and Liability Act (42 USC Secs. 9601(14), 9603(a); 40 CFR Sec. 302.4, Table 302.4, Table 302.4 and App. A)
- CWA Clean Water Act (33 USC Secs. 1311; 1314(b), (c), (e), (g); 136(b), (c); 137(b), (c) [as of 8/2/06])
- RCRA Resource Conservation Recovery Act (42 USC Sec. 6921; 40 CFR Part 261 App VIII)
- SARA Superfund Amendments and Reauthorization Act of 1986 Title III Section 302 Extremely Hazardous Substances (42 USC Secs. 11023, 13106; 40 CFR sec. 372.65) and Section 313 Toxic Chemicals (42 USC Secs. 11023, 13106; 40 CFR Sec. 372.65 [as of 6/30/05])
- TSCA Toxic Substance Control Act (15 U.S.C. s/s 2601 et seq. [1976])
- SDWA Safe Drinking Water Act (42 U.S.C. s/s 300f et seq. [1974])

**State Regulations:** The product, **Copper Alloys** as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations:

Pennsylvania Right to Know: Contains regulated material in the following categories:

- Hazardous Substances: Manganese & Manganese Compounds, Nickel, Silicon, Zirconium, Tin
- Environmental Hazards: Chromium, Chromium Metal, Chromium Compounds (Hexavalent), Copper, Manganese & Manganese Compounds, Nickel, Cobalt, Zinc, Silver
- Special Hazardous Substance: Chromium, Chromium Metal, Chromium Compounds, Nickel

California Prop. 65:



The product, **Copper Alloys** can expose you to chemicals including chromium (hexavalent chromium compounds), nickel (metallic), and cobalt (metal powder & cobalt II oxide), which are known to the State of California to cause cancer; and chromium (hexavalent chromium compounds) which is known to the State of California to cause reproductive toxicity. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

New Jersey: Contains regulated material in the following categories:

- Hazardous Substance: Chromium, Chromium Metal, Chromium Compounds, Copper, Manganese & Manganese Compounds, Nickel, Cobalt, Silicon, Titanium, Zirconium, Tin, Zinc, Silver
- Environmental Hazards: Chromium, Chromium Metal, Chromium Compounds, Copper, Manganese & Manganese Compounds, Nickel, Cobalt, Zinc, Silver
- Special Hazardous Substance: Chromium, Chromium Metal, Chromium Compounds, Manganese & Manganese Compounds, Cobalt

Minnesota: Chromium, Chromium Compounds, Manganese & Manganese Compounds, Nickel, Cobalt, Tin, Zinc, Silver

Massachusetts: Chromium, Chromium Metal, Chromium Compounds, Copper (compounds), Manganese (compounds), Nickel (compounds), Cobalt, Zirconium, Tin, Zinc, Silver

**Other Regulations:**

**WHMIS Classification (Canadian):** The product, **Copper Alloys** is not listed as a whole. However individual components are listed.

Ingredients	WHMIS Classification
Nickel	Skin sensitization – Category 1; Carcinogenicity – Category 2; Specific target organ toxicity – repeated exposure - Category 1
Chromium	Combustible dusts*
Chromium III	Oxidizing solids - Undefined category1; Acute toxicity - oral - Category 2; Acute toxicity - dermal - Category 2; Acute toxicity - inhalation - Category 2; Skin corrosion/irritation - Category 1 (Strong acid: pH of a 1% solution = 1,1); Serious eye damage/eye irritation - Category 1; Respiratory sensitization - Category 1; Skin sensitization - Category 1A; Germ cell mutagenicity - Category 2; Carcinogenicity - Category 1A; Reproductive toxicity - Category 1B (Toxic to the development (Category 1B) Toxic to the reproductive function (Category 2)); Health hazards not otherwise classified (corrosion) - Category 1
Copper	Acute oral toxicity – oral – Category 4; Combustible dusts*
Cobalt	Respiratory sensitization – Category 1; Skin sensitization – Category 1; Carcinogenicity – Category 2
Iron	Combustible dusts - Category 1 (may form combustible dust concentrations in air)
Manganese	Reproductive toxicity - Category 2; Specific target organ toxicity - repeated exposure - Category 1; Combustible dusts*
Silicon	Flammable solids - Category 2 (The classification "Flammable solids" refers to the amorphous form of silicon powder); Combustible dusts**
Zirconium	Flammable solids - Category 2; Self-heating substances and mixtures - Category 2; Combustible dusts**
Titanium (as titanium dioxide)	Carcinogenicity – Category 2

\* This product could belong to the hazard class "Combustible dust", based on various factors related to the combustibility and explosiveness of its dust, including composition, shape and size of the particles.

\*\* This product belongs to the hazard class "Combustible dust" if 5% or more by weight of its composition has a particle size < 500 µm.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.



Section 16 - Other Information

Prepared By: ELLWOOD Quality Steels Company

Original Issue Date: 4/25/2024

4/25/2024 – Original

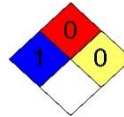
Revised Date: NA

Additional Information:

Hazardous Material Identification System (HMIS) Classification

Health Hazard	1
Fire Hazard	0
Physical Hazard	0

National Fire Protection Association (NFPA)



Hazardous Material Identification System (HMIS) Classification

HEALTH= 1, Denotes possible chronic hazard if airborne dusts or fumes are generated. Irritation or minor reversible injury possible.

FIRE= 0, Materials that will not burn.

PHYSICAL HAZARD= 0, Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives.

National Fire Protection Association (NFPA)

HEALTH = 1, Exposure could cause irritation but only minor residual injury even if no treatment is given.

FLAMMABILITY = 0, Materials that will not burn.

INSTABILITY = 0, Normally stable, even under fire exposure conditions, and are not reactive with water.

ABBREVIATIONS/ACRONYMS:

<b>ACGIH</b>	American Conference of Governmental Industrial Hygienists	<b>NIF</b>	No Information Found
<b>BEIs</b>	Biological Exposure Indices	<b>NIOSH</b>	National Institute for Occupational Safety and Health
<b>CAS</b>	Chemical Abstracts Service	<b>NTP</b>	National Toxicology Program
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act	<b>ORC</b>	Organization Resources Counselors
<b>CLP</b>	Classification, Labelling and Packaging	<b>OSHA</b>	Occupational Safety and Health Administration
<b>CFR</b>	Code of Federal Regulations	<b>PEL</b>	Permissible Exposure Limit
<b>CNS</b>	Central Nervous System	<b>PNOR</b>	Particulate Not Otherwise Regulated
<b>GI, GIT</b>	Gastro-Intestinal, Gastro-Intestinal Tract	<b>PNOC</b>	Particulate Not Otherwise Classified
<b>HMIS</b>	Hazardous Materials Identification System	<b>PPE</b>	Personal Protective Equipment
<b>IARC</b>	International Agency for Research on Cancer	<b>ppm</b>	parts per million
<b>LC50</b>	Median Lethal Concentration	<b>RCRA</b>	Resource Conservation and Recovery Act
<b>LD50</b>	Median Lethal Dose	<b>REACH</b>	Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals
<b>LD<sub>Lo</sub></b>	Lowest Dose to have killed animals or humans	<b>RTECS</b>	Registry of Toxic Effects of Chemical Substances
<b>LEL</b>	Lower Explosive Limit	<b>SARA</b>	Superfund Amendment and Reauthorization Act
<b>LOEL</b>	Lowest Observed Effect Level	<b>SCBA</b>	Self-contained Breathing Apparatus
<b>LOAEC</b>	Lowest Observable Adverse Effect Concentration	<b>SDS</b>	Safety Data Sheet
<b>µg/m<sup>3</sup></b>	microgram per cubic meter of air	<b>STEL</b>	Short-term Exposure Limit
<b>mg/m<sup>3</sup></b>	milligram per cubic meter of air	<b>TLV</b>	Threshold Limit Value
<b>mppcf</b>	million particles per cubic foot	<b>TWA</b>	Time-weighted Average
<b>MSHA</b>	Mine Safety and Health Administration	<b>UEL</b>	Upper Explosive Limit
<b>NFPA</b>	National Fire Protection Association		

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

# Copper Alloys

**Signal Word: Danger**

**Symbols:**



## HAZARD STATEMENTS:

Harmful if swallowed.  
Harmful if inhaled.  
Causes eye irritation.  
May cause an allergic skin reaction.  
May cause allergy or asthma symptoms or breathing difficulties if inhaled.  
May cause cancer.  
Suspected of damaging fertility or the unborn child.  
Causes damage to the respiratory tract through prolonged or repeated exposure if inhaled.

## PRECAUTIONARY STATEMENTS

Avoid breathing or do not breath dusts / fume / gas / mist / vapor / spray.  
Wear protective gloves / protective clothing / eye protection / face protection.  
Contaminated work clothing must not be allowed out of the workplace.  
Use only outdoors or in well ventilated areas.  
Wash thoroughly after handling.  
Do not handle until all safety precautions have been read and understood.  
Do not eat, drink or smoke when using this product  
Obtain special instructions before use.  
If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: call poison center/doctor.  
If exposed or concerned: Get medical advice/attention or call a poison center/doctor.  
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
If eye irritation persists: Get medical advice/attention.  
If on skin: Wash with plenty of water.  
If irritation or rash occurs: Get medical advice/attention.  
Take off contaminated clothing and wash it before reuse.  
If swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth.  
Store locked up.  
Dispose of contents in accordance with federal, state and local regulations.

**SDS ID No.: EQS-7**

ELLWOOD Quality Steels Company  
700 Moravia Street  
New Castle, PA 16101

**General Information: Phone: 330-534-8668**

**CHEMTREC (Day or Night): 1-800-424-9300**

**Original Issue Date: 4/25/2024**

**Revised: NA**