

**Safety Data Sheet (SDS)****Section 1 – Identification****1(a) Product Identifier used on Label:** Carbon Steel Ingot**1(b) Other means of identification:** EQS-02**1(c) Recommended use of the chemical and restrictions on use:** Metal alloy for multiple production uses**1(d) Name, address, and telephone number:**

Ellwood Quality Steels Company Phone number: 724-658-6502
 1 700 Moravia Street
 New Castle, PA 16101

1(e) Emergency phone number: 11-800-424-9300 or CHEMTREC (Day or Night): 1-800-424-9300**Section 2 – Hazard(s) Identification**

2(a) Classification of the chemical: Carbon Steel Ingot 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, Carbon Steel Ingot 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) |
|---------------|---|---------------|---|
| | Carcinogenicity - 2 Reproductive Toxicity - 2 Single Target Organ Toxicity (STOT) Repeat Exposure - 1 | DANGER | Suspected of causing cancer. Suspected of damaging fertility or the unborn child. Causes damage to lungs and central nervous system through prolonged or repeated inhalation exposure. Harmful if Swallowed May cause an allergic skin reaction. May cause respiratory irritation. Causes eye irritation. |
| | Acute Toxicity -Oral - 4 Skin Sensitization - 1 STOT Single Exposure - 3 | | |
| NA | Eye Irritation - 2B | | |

Precautionary Statement(s):

| Prevention | Response | Storage/Disposal |
|---|---|--|
| Do not breathe 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. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not eat, drink or smoke when using this product. | If inhaled: Remove person to fresh air and keep comfortable for breathing. If exposed, concerned or feel unwell: Get medical advice/attention. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue Rinsing. If on skin: Wash with plenty of water. If irritation or rash occurs: Get medical advice/attention. Take off and wash contaminated clothing before reuse. If Swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth. | 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* |
|---------------|------------|-----------|-----------|
| Iron | 7439-89-6 | 231-096-4 | 60-99 |
| Manganese | 7439-96-5 | 231-105-1 | 0.2-10 |
| Silicon | 7440-21-3 | 231-130-8 | 0.1-3 |
| Molybdenum | 7439-98-7 | 231-107-2 | 0.02-1.12 |

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

| Chemical Name | CAS Number | EC Number | % weight* |
|---------------|------------|-----------|-----------|
| Carbon | 7440-44-0 | 231-153-3 | 0.05-1.1 |
| Chromium | 7440-47-3 | 231-157-5 | 0.05-1 |
| Nickel | 7440-02-0 | 231-111-4 | 0.05-0.35 |

EC - European Community

CAS - Chemical Abstract Service

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

"Commercial steel products contain small amounts of various elements in addition to those specified. These small quantities frequently referred to as "trace" or "residual" elements, generally originate in the raw materials used and/or are alloying metals. Individual trace elements vary in concentration by weight, and may include aluminum, boron, calcium, carbon, chromium, columbium (niobium), copper, manganese, molybdenum, nickel, phosphorus, sulfur, titanium, and vanadium."

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

- **Inhalation: Carbon Steel Ingot** as sold/shipped is not a likely form of exposure. However, during further processing (welding, grinding, burning, etc.), if inhaled: Remove person to fresh air and keep comfortable for breathing. If exposed, concerned or feel unwell: Get medical advice/attention.
- **Eye Contact: Carbon Steel Ingot** as sold/shipped is not a likely form of exposure. However, during further processing (welding, grinding, burning, etc.), 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 exposed, concerned or feel unwell: Get medical advice/attention.
- **Skin Contact:** If on skin: Wash thoroughly after handling. Wash with plenty of water. If irritation or rash occurs: Get medical advice/attention. Take off and wash contaminated clothing before reuse. If exposed, concerned or feel unwell: Get medical advice/attention.
- **Ingestion: Carbon Steel Ingot** as sold/shipped is not a likely form of exposure. However, during further processing (welding, grinding, burning, etc.), if exposed, concerned or feel unwell: Get medical advice/attention.

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

- **Inhalation: Carbon Steel Ingot** as sold/shipped is not likely to present an acute or chronic health effect.
- **Eye: Carbon Steel Ingot** as sold/shipped is not likely to present an acute or chronic health effect.
- **Skin: Carbon Steel Ingot** as sold/shipped is not likely to present an acute or chronic health effect.
- **Ingestion: Carbon Steel Ingot** as sold/shipped is not likely to present an acute or chronic health effect.

However, during further processing (welding, grinding, burning, etc.) individual components may illicit an acute or chronic health effect. Refer to Section 11-Toxicological Information.

4(c) Immediate Medical Attention and Special Treatment: None Known**Section 5 – Fire-fighting Measures**

5(a) Suitable (and unsuitable) Extinguishing Media: Not Applicable for **Carbon Steel Ingot** as sold/shipped. Use extinguishers appropriate for surrounding materials.

5(b) Specific Hazards arising from the chemical: Not Applicable for **Carbon Steel Ingot** as sold/shipped. When burned, toxic smoke, fume and vapor may be emitted.

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: Not Applicable for **Carbon Steel Ingot** as sold/shipped. For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust.

6(b) Methods and materials for containment and clean up: Not Applicable for **Carbon Steel Ingot** as sold/shipped. Collect material in appropriate, 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 **Carbon Steel Ingot** as sold/shipped, however further processing (welding, burning, grinding, etc.) with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use only outdoors or in well-ventilated areas. Practice good housekeeping. 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: Store away from acids and incompatible materials.

Section 8 - Exposure Controls / Personal Protection

8(a) Occupational Exposure Limits (OELs): **Carbon Steel Ingot** 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 ¹ | ACGIH TLV ² | NIOSH REL ³ | IDLH ⁴ |
|-------------|---|--|--|---|
| Iron | 10 mg/m ³ (iron oxide fume) | 5.0 mg/m ³ (iron oxide, respirable fraction ⁵) | 5.0 mg/m ³ (iron oxide dust and fume) | 2,500 mg/m ³ (as Fe) |
| Manganese | “C” 5.0 mg/m ³ (as fume & inorganic compounds, as Mn) | 0.02 mg/m ³ (as fume & inorganic compounds, as Mn, respirable fraction) 0.1 mg/m ³ (as fume & inorganic compounds, as Mn, inhalable fraction ⁶) | 1.0 mg/m ³ (as fume & inorganic compounds, as Mn) “STEL” 3.0 mg/m ³ (as fume & inorganic compounds, as Mn) | 500 mg/m ³ (as Mn) |
| Silicon | 15 mg/m ³ (total dust) 5.0 mg/m ³ (as respirable fraction) | NE | 10 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable dust) | NE |
| Molybdenum | 15 mg/m ³ (as Mo insoluble compounds, total dust) 5.0 mg/m ³ (as Mo soluble compounds, respirable fraction) | 10 mg/m ³ (as Mo insoluble compounds, inhalable fraction) 3.0 mg/m ³ (as Mo insoluble compounds, respirable fraction) 0.5 mg/m ³ (as Mo soluble compounds, respirable fraction) | NE | NE |
| Carbon | NE | NE | NE | NE |
| Chromium | 0.5 mg/m ³ (as Cr II & III, inorganic compounds) 1.0 mg/m ³ (as Cr, metal) 0.005 mg/m ³ (as Cr VI, inorganic compounds, water soluble & insoluble) “AL” 0.0025 mg/m ³ (as Cr VI, inorganic compounds, water soluble & insoluble) | 0.003 mg/m ³ (as Cr III, inorganic compounds, inhalable fraction) “DSEN & RSEN” “water-soluble” compounds only 0.5 mg/m ³ (as Cr, metal, inhalable fraction) 0.0002 mg/m ³ (as Cr VI, inorganic compounds, water insoluble & insoluble) “STEL” 0.0005 mg/m ³ (as Cr VI, inorganic compounds, water insoluble & insoluble) | 0.5 mg/m ³ (as Cr II & III, inorganic compounds & metal) 0.0002 mg/m ³ (as Cr VI, inorganic compounds, water insoluble & insoluble) | 250 mg/m ³ (as Cr II & metal) 25 mg/m ³ (as Cr III) 15 mg/m ³ (as Cr VI, Ca) |
| Nickel | 1.0 mg/m ³ (metal, insoluble & soluble compounds, as Ni) | 1.5 mg/m ³ (metal, as Ni, as inhalable fraction) 0.2 mg/m ³ (insoluble compounds, as Ni, inhalable fraction, inorganic only) 0.1 mg/m ³ (soluble compounds, as Ni, inhalable fraction, inorganic only) | 0.015 mg/m ³ (metal & insoluble and soluble compounds, as Ni) | 10 mg/m ³ (as Ni) |

NE - None Established

- 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.
- 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.
- 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.
- 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.
- 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 2022 TLVs[®] and BEIs[®] Appendix D, paragraph C.
- 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 2022 TLVs[®] and BEIs[®] (Biological Exposure Indices) Appendix D, paragraph A.



Section 8 - Exposure Controls / Personal Protection (continued)

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 determine 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 exposures 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 sleeves should be worn when working with steel products. 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 protective clothing, 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

9(b) Odor: Odorless

9(c) Odor Threshold: NA

9(d) pH: NA

9(e) Melting Point/Freezing Point: ~2800 °F (~1537 C)

9(f) Initial Boiling Point and Boiling Range: ND

9(g) Flash Point: NA

9(h) Evaporation Rate: NA

9(i) Flammability (solid, gas): Non-flammable, non-combustible

NA - Not Applicable

ND - Not Determined for product as a whole

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

9(k) Vapor Pressure: NA

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

9(m) Relative Density: 7.6 - 7.8

9(n) Solubility(ies): Insoluble

9(o) Partition Coefficient n-octanol/water: ND

9(p) Auto-ignition Temperature: NA

9(q) Decomposition Temperature: ND

9(r) Viscosity: NA

Section 10 - Stability and Reactivity

10(a) Reactivity: Not Determined (ND) for product in a solid form. Do not use water on molten metal.

10(b) Chemical Stability: Steel products are stable under normal storage and handling conditions.

10(c) Possibility of hazardous reaction: None Known

10(d) Conditions to Avoid: Storage with strong acids or calcium hypochlorite.

10(e) Incompatible Materials: Will react with strong acids to form hydrogen. Iron oxide dusts in contact with calcium hypochlorite evolve oxygen and may cause an explosion.

10(f) Hazardous Decomposition Products: Thermal oxidative decomposition of steel products can produce fumes containing oxides of iron and manganese as well as other alloying elements.

Section 11 - Toxicological Information

11 Information on toxicological effects: The following toxicity data has been determined for **Carbon Steel Ingot** when further processed using the information available for its components applied to the guidance on the preparation of an SDS under the GHS requirements of OSHA and the EU CPL:

| Hazard Classification | Hazard Category | | Hazard Symbols | Signal Word | Hazard Statement |
|--|-----------------|-----------------|----------------|----------------|---|
| | EU | OSHA | | | |
| Acute Toxicity Hazard (covers Categories 1-4) | NA* | 4 ^a | | Warning | Harmful if swallowed- Rating due to iron particulate generated from further processing (welding, grinding, burning, etc.). |
| Eye Damage/ Irritation (covers Categories 1, 2A and 2B) | NA* | 2B ^c | No Pictogram | Warning | Causes eye irritation - Rating due to iron particulate generated from further processing (welding, grinding, burning, etc.). |
| Skin/Dermal Sensitization (covers Category 1) | NA* | 1 ^d | | Warning | May cause an allergic skin reaction - Nickel is a skin sensitizer. |
| Carcinogenicity (covers Categories 1A, 1B and 2) | NA* | 2 ^e | | Warning | Suspected of causing cancer. - Rating due to nickel particulate or fume that can enter the body generated when further processed (welding, grinding, burning, etc.). |
| Toxic Reproduction (covers Categories 1A, 1B and 2) | NA* | 2 ^h | | 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.). |
| Specific Target Organ Toxicity (STOT) Following Single Exposure (covers Categories 1-3) | NA* | 3 ⁱ | | Warning | May cause respiratory irritation. Rating due to iron 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 ^j | | Danger | Causes damage to lungs and central nervous system through prolonged or repeated inhalation exposure. Rating due to nickel or manganese particulate or fume that can enter the body generated when further processed (welding, grinding, burning, etc.). |

* Not Applicable - Semi-formed steel 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).

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 LC₅₀ or LD₅₀ has been established for **Carbon Steel Ingot**. The following data has been determined for the components:

- **Iron:** Rat LD₅₀ =98.6 g/kg (REACH)
Rat LD₅₀ =1060 mg/kg (IUCLID)
Rat LD₅₀ =984 mg/kg (IUCLID)
Rabbit LD₅₀ =890 mg/kg (IUCLID)
Guinea Pig LD₅₀ =20 g/kg (TOXNET)
- **Nickel:** LD₅₀ >9000 mg/kg (Oral/Rat)
- **Silicon:** LD₅₀ = 3160 mg/kg (Oral/Rat)
- **Carbon:** LD₅₀ = >10,000 mg/kg (Oral/ Rat)
- **Manganese:** Rat LD₅₀ > 2000 mg/kg (REACH)
Rat LD₅₀ > 9000 mg/kg (NLM Toxnet)

b. No Skin (Dermal) Irritation data available for **Carbon Steel Ingot** as a mixture. The following Skin (Dermal) Irritation information was found for the components:

- **Molybdenum:** May cause skin irritation.

c. No Eye Irritation data available for **Carbon Steel Ingot** as a mixture. The following Eye Irritation information was found for the components:

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

d. No Skin (Dermal) Sensitization data available for **Carbon Steel Ingot** as a mixture. The following Skin (Dermal) Sensitization information was found for the components:

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

e. No Respiratory Sensitization data available for **Carbon Steel Ingot** as a mixture or its components.

f. No Germ Cell Mutagenicity data available for **Carbon Steel Ingot** as a mixture. The following Mutagenicity and Genotoxicity 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.

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

- **Nickel and certain nickel compounds:** IARC-1 (compounds), carcinogen to humans; IARC-2B (elemental & alloys), possibly carcinogenic to humans; ACGIH TLV-A1 (insoluble compounds, as Ni), confirmed human carcinogen; TLV-A5 (elemental), not suspected as a human carcinogen; NTP-K, known to be a carcinogen; NIOSH-Ca, potential occupational carcinogen
- **Iron Oxide (Fe₂O₃):** IARC-3, unclassifiable as to carcinogenicity in humans; ACGIH TLV-A4, not classifiable as a human carcinogen
- **Molybdenum (soluble compounds, as Mo):** ACGIH TLV-A3, confirmed animal carcinogen with unknown relevance to humans

Section 11 - Toxicological Information (continued)

11 Information on toxicological effects (continued):

g. Carcinogenicity (continued)

- **Chromium (as metal and trivalent chromium 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):** 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)
- **Manganese (inorganic compounds, as Mn):** ACGIH TLV-A4, not classifiable as a human carcinogen; EPA-D, not classifiable as to human carcinogenicity (CBD, cannot be determined)
- **Manganese (fume, as Mn):** EPA-D, not classifiable as to human carcinogenicity (CBD, cannot be determined)

Welding Fumes: IARC-1, carcinogen to humans; NIOSH-Ca, potential occupational carcinogen

h. No Toxic Reproduction data available for **Carbon Steel Ingot** as a mixture. The following Toxic Reproductive information was found for the components:

- **Nickel:** Effects on fertility.

i. No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **Carbon Steel Ingot** as a mixture. The following STOT following a Single Exposure data was found for the components:

- **Iron and Molybdenum:** Irritating to Respiratory tract.

j. No Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available for **Carbon Steel Ingot** as a whole. The following STOT following Repeated Exposure data was found for the components:

- **Nickel:** Rat 4 wk inhalation LOEL 4 mg/m³ Lung and Lymph node histopathology. Rat 2 yr inhalation LOEL 0.1 mg/ m³ Pigment in kidney, effects on hematopoiesis spleen and bone marrow and adrenal tumor. Rat 13 Week Inhalation LOAEC 1.0 mg/m³ 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).

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 2022, 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. 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 exposures 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:

- **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.
- **Silicon and silicon oxides:** May be harmful if swallowed.
- **Molybdenum and Oxides:** Molybdenum causes skin and eye irritation. Molybdenum oxide is toxic if swallowed, and causes eye irritation
- **Carbon:** Not Reported/Not classified
- **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.
- **Nickel and nickel oxides:** Nickel may cause allergic skin sensitization. Nickel oxide may cause an allergic skin.

**Section 11 - Toxicological Information (continued)****Delayed (chronic) Effects by component:**

- **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.
- **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.
- **Molybdenum and Oxides:** Certain handling operations, such as burning and welding, may generate both insoluble molybdenum compounds (metal and molybdenum dioxide) and soluble molybdenum compounds (molybdenum trioxide). Molybdenum compounds generally exhibit a low order of toxicity with the trioxide the more toxic. However, some reports indicate that the dust of the molybdenum metal, molybdenum dioxide and molybdenum trioxide may cause eye, skin, nose and throat irritation in animals.
- **Carbon:** Chronic inhalation may lead to decreased pulmonary function.
- **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.
- **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.

Section 12 - Ecological Information

12(a) Ecotoxicity (aquatic & terrestrial): No Data Available for **Carbon Steel Ingot** as sold/shipped. However, individual components of the product when processed have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife as follows:

- **Iron Oxide:** LC₅₀: >1000 mg/L; Fish 48 h-EC₅₀ > 100 mg/L (Currenta, 2008k); 96 h-LC₀ ≥ 50,000 mg/L Test substance: Bayferrox 130 red (95 – 97% Fe₂O₃; < 4% SiO₂ and Al₂O₃) (Bayer, 1989a).
- **Hexavalent Chrome:** EU RAR listed as category 1, found acute EC₅₀ and LD₅₀ to algae and invertebrates < 1 mg.
- **Nickel Oxide:** IUCLID found LC₅₀ in fish, invertebrates and algae > 100 mg/l.

12(b) Persistence & Degradability: No Data Available for **Carbon Steel Ingot** as sold/shipped or individual components.

12(c) Bioaccumulative Potential: No Data Available for **Carbon Steel Ingot** as sold/shipped or individual components.

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

12(e) Other adverse effects: None Known

Additional Information:

Hazard Category: Not Reported

Signal Word: No Signal Word

Hazard Symbol: No Symbol

Hazard Statement: No Statement

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 **Carbon Steel Ingot** 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 **Carbon Steel Ingot** as a hazardous material. All Local, State, Federal and international 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 Steels 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, **Carbon Steel Ingot** 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, **Carbon Steel Ingot** is not listed as a whole. However, individual components of the product are listed:

| Components | Regulations |
|------------|-----------------------------|
| Manganese | SARA 313, TSCA |
| Chromium | CERCLA, SARA 313 |
| Nickel | CERCLA, CWA, SARA 313, TSCA |

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

Section 313 Supplier Notification: The product, **Carbon Steel Ingot** 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:

| CAS # | Chemical Name | Percent by Weight |
|-----------|---------------|-------------------|
| 7439-96-5 | Manganese | 10 max |
| 7440-47-3 | Chromium | 1 max |
| 7440-02-0 | Nickel | 0.35 max |


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, **Carbon Steel Ingot** 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, Silicon, Molybdenum, Chromium, Nickel
- Environmental Hazards: Manganese, Chromium, Nickel
- Special Hazardous Substance: Chromium, Nickel

California Prop. 65:  **WARNING:** The product, **Carbon Steel Ingot** can expose you to chemicals including chromium (hexavalent chromium compounds), nickel (metallic), which is 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.

New Jersey: Contains regulated material in the following categories:

- Hazardous Substance: Manganese, Silicon, Molybdenum, Chromium, Nickel
- Environmental Hazards: Manganese, Chromium, Nickel
- Special Hazardous Substance: Manganese, Silicon, Chromium

Minnesota: Manganese, Molybdenum, Chromium, Nickel

Massachusetts: Manganese (compounds), Silicon, Molybdenum, Chromium, Nickel (compounds)

Other Regulations:

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

| Ingredients | WHMIS Classification |
|-------------|---|
| 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** |
| Molybdenum | Combustible dusts* |
| Chromium | Combustible dusts* |
| Nickel | Skin sensitization - Category 1; Carcinogenicity - Category 2; Specific target organ toxicity - repeated exposure - Category 1 |
| Carbon | Combustible dusts* |

* 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: 3/26/2012

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3/10/2014 – Supersedes 3/26/2012 version

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8/09/2021– Supersedes 6/01/2017 version

10/21/2022– Supersedes 8/09/2021 version

Additional Information:

Hazardous Material Identification System (HMIS) Classification

| | |
|-----------------|---|
| Health Hazard | 1 |
| Fire Hazard | 0 |
| Physical Hazard | 0 |

National Fire Protection Association (NFPA)



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.

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:

| | | | |
|-------------------------|---|--------------|--|
| ACGIH | American Conference of Governmental Industrial Hygienists | NIF | No Information Found |
| BEIs | Biological Exposure Indices | NIOSH | National Institute for Occupational Safety and Health |
| CAS | Chemical Abstracts Service | NTP | National Toxicology Program |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act | ORC | Organization Resources Counselors |
| CLP | Classification, Labelling and Packaging | OSHA | Occupational Safety and Health Administration |
| CFR | Code of Federal Regulations | PEL | Permissible Exposure Limit |
| CNS | Central Nervous System | PNOR | Particulate Not Otherwise Regulated |
| GI, GIT | Gastro-Intestinal, Gastro-Intestinal Tract | PNOC | Particulate Not Otherwise Classified |
| HMIS | Hazardous Materials Identification System | PPE | Personal Protective Equipment |
| IARC | International Agency for Research on Cancer | ppm | parts per million |
| LC50 | Median Lethal Concentration | RCRA | Resource Conservation and Recovery Act |
| LD50 | Median Lethal Dose | REACH | Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals |
| LD_{Lo} | Lowest Dose to have killed animals or humans | RTECS | Registry of Toxic Effects of Chemical Substances |
| LEL | Lower Explosive Limit | SARA | Superfund Amendment and Reauthorization Act |
| LOEL | Lowest Observed Effect Level | SCBA | Self-contained Breathing Apparatus |
| LOAEC | Lowest Observable Adverse Effect Concentration | SDS | Safety Data Sheet |
| µg/m³ | microgram per cubic meter of air | STEL | Short-term Exposure Limit |
| mg/m³ | milligram per cubic meter of air | TLV | Threshold Limit Value |
| mppcf | million particles per cubic foot | TWA | Time-weighted Average |
| MSHA | Mine Safety and Health Administration | UEL | Upper Explosive Limit |
| NFPA | 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.

Carbon Steel Ingot

Signal Word: **DANGER**

Symbols:



HAZARD STATEMENTS:

Suspected of causing cancer.
Suspected of damaging fertility or the unborn child.
Causes damage to lungs and central nervous system through prolonged or repeated inhalation exposure.
Harmful if Swallowed
May cause an allergic skin reaction.
May cause respiratory irritation.
Causes eye irritation.

PRECAUTIONARY STATEMENTS

Do not breathe 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.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not eat, drink or smoke when using this product.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
If exposed, concerned or feel unwell: Get medical advice/attention.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue Rinsing.
If on skin: Wash with plenty of water. If irritation or rash occurs: Get medical advice/attention. Take off and wash contaminated clothing before reuse.
If Swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth.
Dispose of contents in accordance with federal, state and local regulations.

SDS ID No.: EQS-02

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General Information: Phone: 724-658-6502

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

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