

## Safety Data Sheet (SDS)

### Section 1 – Identification

**1(a) Product Identifier used on Label:** Stainless Steel

**1(b) Other means of identification:** Duracorr, Stainless Steel Plate: Group I, II, III, Plate-Stainless Steel

**1(c) Recommended use of the chemical and restrictions on use:** These products are sold to all steel-consuming industries including automotive, heavy machinery, pipes and tubes, construction, packaging and appliances. The main markets for these products are construction and mechanical engineering, as well as energy and automotive applications.

**1(d) Name, address, and telephone number:**



Cleveland-Cliffs Steel	Phone number: 219-787-4901 or
1 South Dearborn Street	email at: <a href="mailto:sdssupport@clevelandcliffs.com">sdssupport@clevelandcliffs.com</a>
Chicago, IL 60603-9888	

**1(e) Emergency phone number:** 1-760-476-3962 (Versik 3E Company Code: 333211) or CHEMTREC (Day or Night): 1-800-424-9300

### Section 2 – Hazard(s) Identification

**2(a) Classification of the chemical:** **Stainless Steel** 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, **Stainless Steel** 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	<b>DANGER</b>	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. May cause an allergic skin reaction. May cause respiratory irritation. Causes eye irritation.
	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. Call a poison center/doctor if you feel unwell.	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	>50
Chromium	7440-47-3	231-157-5	10.5-26
Manganese	7439-96-5	231-105-1	1.5-10

### 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*
Molybdenum	7439-98-7	231-107-2	0.20-5
Nickel	7440-02-0	231-111-4	0.99-22
Silicon	7440-21-3	231-130-8	0.7-1.5

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.

### Section 4 – First-aid Measures

#### 4(a) Description of necessary measures:

- **Inhalation: Stainless Steel** 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: Stainless Steel** 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 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: Stainless Steel** 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: Stainless Steel** as sold/shipped is not likely to present an acute or chronic health effect.
- **Eye: Stainless Steel** as sold/shipped is not likely to present an acute or chronic health effect.
- **Skin: Stainless Steel** as sold/shipped is not likely to present an acute or chronic health effect.
- **Ingestion: Stainless Steel** 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 **Stainless Steel** as sold/shipped. Use extinguishers appropriate for surrounding materials.

**5(b) Specific Hazards arising from the chemical:** Not Applicable for **Stainless Steel** 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 **Stainless Steel** 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 **Stainless Steel** 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 **Stainless Steel** 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):** Stainless Steel 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>
Iron	10 mg/m <sup>3</sup> (iron oxide fume)	5.0 mg/m <sup>3</sup> (iron oxide, respirable fraction <sup>5</sup> )	5.0 mg/m <sup>3</sup> (iron oxide dust and fume)	2,500 mg/m <sup>3</sup> (as Fe)
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>6</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) "STEL" 0.0005 mg/m <sup>3</sup> (as Cr VI, inorganic compounds, water insoluble & insoluble)	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)
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)
Molybdenum	15 mg/m <sup>3</sup> (as total dust, PNOR <sup>7</sup> ) 5.0 mg/m <sup>3</sup> (as respirable fraction, PNOR)	10 mg/m <sup>3</sup> (as Mo insoluble compounds, inhalable fraction) 3.0 mg/m <sup>3</sup> (as Mo insoluble compounds, respirable fraction) 0.5 mg/m <sup>3</sup> (as Mo soluble compounds, respirable fraction)	NE	NE
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) 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)
Silicon	15 mg/m <sup>3</sup> (total dust, PNOR) 5.0 mg/m <sup>3</sup> (as respirable fraction, PNOR)	10 mg/m <sup>3</sup>	10 mg/m <sup>3</sup> (as total dust) 5.0 mg/m <sup>3</sup> (as respirable dust)	NE

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 2021 TLVs<sup>®</sup> and BEIs<sup>®</sup> 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 2021 TLVs<sup>®</sup> and BEIs<sup>®</sup> (Biological Exposure Indices) Appendix D, paragraph A.
- PNOR (Particulates Not Otherwise Regulated). All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by a limit which is the same as the inert or nuisance dust limit of 15 mg/m<sup>3</sup> for total dust and 5.0 mg/m<sup>3</sup> for the respirable fraction.

**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...

### Section 8 - Exposure Controls / Personal Protection (continued)

#### 8(c) Individual Protection Measures (continued):

- **Respiratory Protection (continued):** ... 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 Gray

**9(b) Odor:** Odorless

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

**9(d) pH:** NA

**9(e) Melting Point/Freezing Point:** ~2750 °F (~1510 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:** 7.85

**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 **Stainless Steel** 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			
<b>Eye Damage/ Irritation</b> (covers Categories 1, 2A and 2B)	NA*	2B <sup>c</sup>	No Pictogram	<b>Warning</b>	Causes eye irritation - Rating due to iron particulate generated from further processing (welding, grinding, burning, etc.).
<b>Skin/Dermal Sensitization</b> (covers Category 1)	NA*	1 <sup>d</sup>		<b>Warning</b>	May cause an allergic skin reaction - Nickel is a skin sensitizer.
<b>Carcinogenicity</b> (covers Categories 1A, 1B and 2)	NA*	2 <sup>e</sup>		<b>Warning</b>	Suspected of causing cancer. - Rating due to nickel particulate or fume that can enter the body generated when further processed (welding, grinding, burning, etc.).

### Section 11 - Toxicological Information (continued)

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

Hazard Classification	Hazard Category		Hazard Symbols	Signal Word	Hazard Statement
	EU	OSHA			
<b>Toxic Reproduction</b> (covers Categories 1A, 1B and 2)	NA*	2 <sup>h</sup>		<b>Warning</b>	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.).
<b>Specific Target Organ Toxicity (STOT) Following Single Exposure</b> (covers Categories 1-3)	NA*	3 <sup>i</sup>		<b>Warning</b>	May cause respiratory irritation. - Rating due to iron particulate or fume that can enter the body generated when further processed (welding, grinding, burning, etc.).
<b>STOT following Repeated Exposure</b> (covers Categories 1 and 2)	NA*	1 <sup>j</sup>		<b>Danger</b>	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 LC<sub>50</sub> or LD<sub>50</sub> has been established for **Stainless Steel**. The following data has been determined for the components:
- **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)
  - **Nickel:** LD<sub>50</sub> >9000 mg/kg (Oral/Rat)
  - **Silicon:** LD<sub>50</sub> = 3160 mg/kg (Oral/Rat)
  - **Manganese:** Rat LD<sub>50</sub> > 2000 mg/kg (REACH)  
Rat LD<sub>50</sub> > 9000 mg/kg (NLM Toxnet)
- b. No Skin (Dermal) Irritation data available for **Stainless Steel** 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 **Stainless Steel** 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 **Stainless Steel** 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 **Stainless Steel** as a mixture or its components.
- f. No Germ Cell Mutagenicity data available for **Stainless Steel** 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 **Stainless Steel** 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
  - **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 (by inhalation route of entry), EPA-K, cannot be determined, not classifiable as to human carcinogenicity.
  - **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
  - **Molybdenum (soluble compounds, as Mo):** ACGIH TLV-A3, confirmed animal carcinogen with unknown relevance to humans
  - **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-2B, possibly carcinogenic to humans; NIOSH-Ca, potential occupational carcinogen.
- h. No Toxic Reproduction data available for **Stainless Steel** as a mixture. The following Toxic Reproductive information was found for the components:
- **Nickel:** Effects on fertility.



## Section 11 - Toxicological Information (continued)

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

- i. No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **Stainless Steel** 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 **Stainless Steel** as a whole. 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).

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 2021, 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.
- **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.
- **Manganese and manganese oxides:** Manganese and Manganese oxide are harmful if swallowed.
- **Molybdenum and Oxides:** Molybdenum causes skin and eye irritation. Molybdenum oxide is toxic if swallowed, and causes eye irritation
- **Nickel and nickel oxides:** Nickel may cause allergic skin sensitization. Nickel oxide may cause an allergic skin.
- **Silicon and silicon oxides:** May be harmful if swallowed.

#### 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.
- **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.
- **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.

### Section 11 - Toxicological Information (continued)

#### Delayed (chronic) Effects by component (continued):

- **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.
- **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.

### Section 12 - Ecological Information

**12(a) Ecotoxicity (aquatic & terrestrial):** No Data Available for **Stainless Steel** 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:** LC<sub>50</sub>: >1000 mg/L; Fish 48 h-EC<sub>50</sub> > 100 mg/L (Currenta, 2008k); 96 h-LC<sub>0</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).
- **Hexavalent Chrome:** EU RAR listed as category 1, found acute EC<sub>50</sub> and LD<sub>50</sub> to algae and invertebrates < 1 mg.
- **Nickel Oxide:** IUCLID found LC<sub>50</sub> in fish, invertebrates and algae > 100 mg/l.

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

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

**12(d) Mobility (in soil):** No data available for **Stainless Steel** 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:** Steel scrap should be recycled whenever possible. Product dusts and fumes from processing operations should also be recycled or classified by a competent environmental professional and disposed of in accordance with applicable federal, state or local regulations.

**Container Cleaning and Disposal:** Follow applicable federal, state and local regulations. Observe safe handling precautions. European Waste Catalogue (EWC): 16-01-17 (ferrous metals), 12-01-99 (wastes not otherwise specified), 16-03-04 (off specification batches and unused products), or 15-01-04 (metallic packaging).

Please note this information is for **Stainless Steel** 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 **Stainless Steel** 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.

Shipping Name: Not Applicable (NA)	Packaging Authorizations	Quantity Limitations
Shipping Symbols: NA	a) Exceptions: NA	a) Passenger, Aircraft, or Railcar: NA
Hazard Class: NA	b) Group: NA	b) Cargo Aircraft Only: NA
UN No.: NA	c) Authorization: NA	Vessel Stowage Requirements
Packing Group: NA		a) Vessel Stowage: NA
DOT/ IMO Label: NA		b) Other: NA
Special Provisions (172.102): NA		DOT Reportable Quantities: N A

**International Maritime Dangerous Goods (IMDG) and the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID)** classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

**Regulations Concerning the International Carriage of Dangerous Goods by Road (ADR)** does not regulate **Stainless Steel** as a hazardous material.

Shipping Name: Not Applicable (NA)	Packaging	Portable Tanks & Bulk Containers
Classification Code: NA	a) Packing Instructions: NA	a) Instructions: NA
UN No.: NA	b) Special Packing Provisions: NA	b) Special Provisions: NA
Packing Group: NA	c) Mixed Packing Provisions: NA	
ADR Label: NA		
Special Provisions: NA		
Limited Quantities: NA		

### Section 14 - Transport Information (continued)

**International Air Transport Association (IATA) does not regulate Stainless Steel** as a hazardous material.

<b>Shipping Name:</b> Not Applicable (NA) <b>Class/Division:</b> NA <b>Hazard Label (s):</b> NA <b>UN No.:</b> NA <b>Packing Group:</b> NA <b>Excepted Quantities (EQ):</b> NA	<b>Passenger &amp; Cargo Aircraft</b>		<b>Cargo Aircraft Only:</b>	<b>Special Provisions:</b>	
	<b>Limited Quantity (EQ)</b>				<b>Pkg Inst:</b> NA
	<b>Pkg Inst:</b> NA		<b>Pkg Inst:</b> NA	<b>Max Net Qty/Pkg:</b>	<b>ERG Code:</b> NA
	<b>Max Net Qty/Pkg:</b> NA		<b>Max Net Qty/Pkg:</b> NA		
Pkg Inst – Packing Instructions		Max Net Qty/Pkg – Maximum Net Quantity per Package		ERG – Emergency Response Drill Code	

**Transport Dangerous Goods (TDG) Classification:** Stainless Steel does not have a TDG classification.

### Section 15 - Regulatory Information

**Regulatory Information:** The following listing of regulations relating to a Cleveland-Cliffs Steel 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, **Stainless Steel** 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, **Stainless Steel** is not listed as a whole. However, individual components of the product are listed:

Components	Regulations
Chromium	CERCLA, SARA 313
Manganese	SARA 313, TSCA
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, **Stainless Steel** 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
7440-47-3	Chromium	26 max
7439-96-5	Manganese	10 max
7440-02-0	Nickel	22 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, **Stainless Steel** 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: Chromium, Manganese, Molybdenum, Nickel, Silicon
- Environmental Hazards: Chromium, Manganese, Nickel
- Special Hazardous Substance: Chromium, Nickel

California Prop. 65:  **WARNING:** This product 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](http://www.P65Warnings.ca.gov).

New Jersey: Contains regulated material in the following categories:

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

Minnesota: Chromium, Manganese, Molybdenum, Nickel

Massachusetts: Chromium, Manganese, Molybdenum, Silicon, Nickel



### Section 15 - Regulatory Information (continued)

**Other Regulations:**

**WHMIS Classification (Canadian):** The product, **Stainless Steel** 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)
Chromium	Combustible dusts*
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*
Nickel	Skin sensitization - Category 1; Carcinogenicity - Category 2; Specific target organ toxicity - repeated exposure - Category 1

\* 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

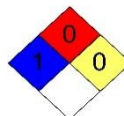
**Prepared By:** Cleveland-Cliffs Steel

**Original Issue Date:** 8/26/2002

**Revised Date:** 04/16/2021

**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:**

<b>ACGIH</b>	American Conference of Governmental Industrial Hygienists
<b>BEIs</b>	Biological Exposure Indices
<b>CAS</b>	Chemical Abstracts Service
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act
<b>CLP</b>	Classification, Labelling and Packaging
<b>CFR</b>	Code of Federal Regulations
<b>CNS</b>	Central Nervous System
<b>GI, GIT</b>	Gastro-Intestinal, Gastro-Intestinal Tract
<b>HMIS</b>	Hazardous Materials Identification System
<b>IARC</b>	International Agency for Research on Cancer
<b>LC50</b>	Median Lethal Concentration
<b>LD50</b>	Median Lethal Dose
<b>LD<sub>Lo</sub></b>	Lowest Dose to have killed animals or humans
<b>LEL</b>	Lower Explosive Limit
<b>LOEL</b>	Lowest Observed Effect Level
<b>LOAEC</b>	Lowest Observable Adverse Effect Concentration
<b>µg/m<sup>3</sup></b>	microgram per cubic meter of air
<b>mg/m<sup>3</sup></b>	milligram per cubic meter of air
<b>mppcf</b>	million particles per cubic foot
<b>MSHA</b>	Mine Safety and Health Administration
<b>NFPA</b>	National Fire Protection Association

<b>NIF</b>	No Information Found
<b>NIOSH</b>	National Institute for Occupational Safety and Health
<b>NTP</b>	National Toxicology Program
<b>ORC</b>	Organization Resources Counselors
<b>OSHA</b>	Occupational Safety and Health Administration
<b>PEL</b>	Permissible Exposure Limit
<b>PNOR</b>	Particulate Not Otherwise Regulated
<b>PNOC</b>	Particulate Not Otherwise Classified
<b>PPE</b>	Personal Protective Equipment
<b>ppm</b>	parts per million
<b>RCRA</b>	Resource Conservation and Recovery Act
<b>REACH</b>	Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals
<b>RTECS</b>	Registry of Toxic Effects of Chemical Substances
<b>SARA</b>	Superfund Amendment and Reauthorization Act
<b>SCBA</b>	Self-contained Breathing Apparatus
<b>SDS</b>	Safety Data Sheet
<b>STEL</b>	Short-term Exposure Limit
<b>TLV</b>	Threshold Limit Value
<b>TWA</b>	Time-weighted Average
<b>UEL</b>	Upper Explosive Limit

**Disclaimer:** This information is taken from sources or based upon data believed to be reliable. Our objective in sending this information is to help you protect the health and safety of your personnel and to comply with the OSHA Hazard Communication Standard and Title III of the Emergency Planning and Community Right-to-Know Act. Cleveland-Cliffs Steel makes no warranty as to the absolute correctness, completeness, or sufficiency of any of the foregoing, or any additional, or other measures that may not be required under particular conditions. THIS CLEVELAND-CLIFFS STEEL SDS MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY, OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND ANY IMPLIED WARRANTIES OTHERWISE ARISING FROM COURSE OF DEALING OR TRADE.

# Stainless Steel

Signal Word: **DANGER**

Symbols:



## HAZARD STATEMENTS:

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

## 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.  
Call a poison center/doctor if you feel unwell.  
Dispose of contents in accordance with federal, state and local regulations.

### SDS ID No.: CLF-005

Cleveland-Cliffs Steel  
1 South Dearborn Street  
Chicago, IL 60603-9888

**General Information: Phone:** 219-787-4901 or email at: [sdssupport@clevelandcliffs.com](mailto:sdssupport@clevelandcliffs.com)

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

**Emergency Contact: 1-760-476-3962, (Versik 3E Company Code: 333211)**

**Original Issue Date:** 08/26/2002

**Revised:** 04/16/2021