

# MATERIAL SAFETY DATA SHEET

Complies with ANSI Z400.1 format

HMIS Code

Health	1*
Fire Hazard	0
Physical Hazard	0
Personal Protection for welding or cutting product	D

**PRODUCTS:** Carbon Steel Products  
Cascade Steel Rolling Mills

**Date of Preparation:** 01/01  
**Revised:** 4/03, 9/05, 1/08, 10/10

## Section 1 Product and Company Information

**Chemical Name & Synonyms:** Carbon Steel Products

**Chemical Family:** Metal

**Formula:** Mixture (Steel)

**Manufacturers Name:**

Cascade Steel Rolling Mills  
P.O. Box 687  
3200 North Highway 99W  
McMinnville, OR 97128-9399

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## Section 2 Hazards Identification

**General Hazard Statement:** Hazards associated with carbon steel relate to the metal compounds that can be emitted as airborne contaminants under certain processing conditions such as burning, welding, melting, cutting, brazing, sawing, grinding, milling and machining. Residual levels of hexavalent chromium may be emitted during welding or cutting.

**Effects of Overexposure:** Carbon steel products under normal conditions do not present inhalation, ingestion, or contact health hazards. When product is subjected to welding, burning, melting, sawing, brazing, grinding, or other similar processes, potentially hazardous airborne particulate and fumes may be generated. Exposures to high concentrations of metallic fumes or dusts may result in irritation of the respiratory tract and/or sensitization of the lungs and other mucous membranes. Signs and symptoms of overexposure include redness, swelling, itching, and/or irritation of skin and eyes, respiratory difficulties such as coughing, wheezing, shortness of breath, central nervous system effects, flu-like symptoms, anorexia and weight loss.

**Acute:** Exposure to metal particulates or fumes can cause eye, skin, and respiratory tract irritation and/or sensitization. Excessive inhalation of fumes from many metals can produce an acute reaction known as "metal fume fever". Ingestion of harmful amounts of product as distributed is unlikely due to its solid, insoluble form. Ingestion of dust may cause nausea and/or vomiting. Serious effects may occur if large amounts of dust are ingested. Skin contact with dust may cause irritation or sensitization, possibly leading to dermatitis.

**Section 2 Hazards Identification – Continued**

**Chronic:** Excessive and repeated exposures to fume or dust generated during processing may cause:

Allergic sensitization – dermatitis and asthma  
 Lung inflammation and damage – pneumonitis, pneumonia, bronchitis, siderosis, diffuse pulmonary fibrosis  
 Nasal perforation and nasal cavity damage  
 Eye inflammation  
 Central nervous system damage, possibly permanent  
 Kidney damage  
 Liver damage  
 Gout – inflammation of the joints

**Target Organs:** Respiratory tract and various organ systems.

**Route of Entry:** Inhalation, ingestion (dusts or fumes)

**Carcinogenicity:** The carcinogenicity of this solid product as a whole has not been tested. Individual components and some compounds of these elemental metals may have been associated with carcinogenicity by NTP and IARC.

- Carbon black – IARC Cancer Review Group 2B. Possibly carcinogenic to humans. OSHA/ACGIH Not classifiable as a human carcinogen.
- Chromium VI – IARC Cancer Review Group 1. OSHA/ACGIH Carcinogenic to humans.
- Vanadium – IARC Cancer Review Group 2B. Possibly carcinogenic to humans. OSHA/ACGIH Confirmed animal carcinogen with unknown relevance to humans.
- Nickel and certain nickel compounds have been listed by NTP as being reasonably anticipated to be carcinogens. IARC has listed nickel compounds within Group 1 and nickel within group 2B

All other chemical components related to cancer are trace amounts at less than 0.1%: Lead IARC Group 2A

**Section 3 Composition/Information on Ingredients**

Base Metal, Alloying Elements and Coatings	% Weight (approximate)	OSHA PEL	ACGIH TLV
Iron (base metal)	95%-99.5%	10 mg/m <sup>3</sup> as iron oxide fume	5 mg/m <sup>3</sup> respirable
Carbon	0.01%-1.0%	As carbon black 3.5 mg/m <sup>3</sup>	As carbon black 3.5 mg/m <sup>3</sup>
Manganese	0.1%-2%	5 mg/m <sup>3</sup> ceiling limit	0.2 mg/m <sup>3</sup>
Phosphorus	<0.1%	0.1 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup> (yellow)
Sulfur	<0.1%	5 ppm as sulfur dioxide	2 ppm as sulfur dioxide
Silicon	0.01%-1.0%	10 mg/m <sup>3</sup> – total 5 mg/m <sup>3</sup> – respirable	10 mg/m <sup>3</sup> inhalable
Copper	0.05%-0.6%	0.1 mg/m <sup>3</sup> – fume 1 mg/m <sup>3</sup> – dust	0.2 mg/m <sup>3</sup> – fume 1 mg/m <sup>3</sup> – dust
Nickel	0.03%-0.2%	1 mg/m <sup>3</sup>	1.5 mg/m <sup>3</sup> inhalable
Chromium	0.01%-1%	0.5 mg/m <sup>3</sup> as Metal & Cr III 0.005 mg/m <sup>3</sup> as Cr VI 8-hr TWA and 0.0025 mg/m <sup>3</sup> as Action Limit	0.5 mg/m <sup>3</sup> as Metal & Cr III 0.01 mg/m <sup>3</sup> as insoluble Cr VI
Vanadium	<0.1%-0.15%	0.5 mg/m <sup>3</sup> respirable 0.005 mg/m <sup>3</sup> fume	0.05 mg/m <sup>3</sup> inhalable as vanadium pentoxide
Molybdenum	<0.1%	10 mg/m <sup>3</sup> insoluble compounds	10 mg/m <sup>3</sup> inhalable 3 mg/m <sup>3</sup> – respirable
Tin	<0.1%	10 mg/m <sup>3</sup> total fume	2 mg/m <sup>3</sup>

		5 mg/m <sup>3</sup> respirable fume	
<b>Section 3 Composition/Information on Ingredients - Continued</b>			
Base Metal, Alloying Elements and Coatings	% Weight (approximate)	OSHA PEL	ACGIH TLV
Aluminum	<0.1%	10 mg/m <sup>3</sup> total 5 mg/m <sup>3</sup> respirable	1 mg/m <sup>3</sup>
Niobium	<0.1%	None	None
Calcium oxide	<0.1%	5 mg/m <sup>3</sup>	2 mg/m <sup>3</sup>
Boron	<0.1%	10 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>
Lead	<0.1%	0.05 mg/m <sup>3</sup>	0.05 mg/m <sup>3</sup>
Zinc	<0.1%	10 mg/m <sup>3</sup> total dust 5 mg/m <sup>3</sup> respirable dust 5 mg/m <sup>3</sup> fume	2 mg/m <sup>3</sup> respirable 10 mg/m <sup>3</sup> respirable STEL
<b>Notations:</b> OSHA PEL = Federal OSHA Permissible Exposure Limit (Note in some state programs the level may be lower) ACGIH TLV = American Conference of Governmental Industrial Hygienist Threshold Limit Values (recommended limits) TWA = time weighted average STEL = short term exposure limit Ceiling Limit = at no time shall exposures exceed this limit. Total = total dust Respirable = collection of respirable sized particles			

## Section 4 First Aid Measures

**Inhalation:** Remove from area to fresh air. Seek medical attention if breathing becomes difficult.

**Eye Contact (Dust):** Immediately flush eyes with copious amounts of water for at least 15 minutes. Assure adequate flushing of the eyes by separating the eyelids with fingers. Seek emergency medical care if irritation persists.

**Skin Contact:** Wash with soap and rinse with copious amounts of water. Remove and wash contaminated clothing. If persistent rash or irritation occurs, seek medical attention.

**Ingestion:** Get medical attention immediately.

## Section 5 Fire Fighting Measures

<b>Flash point (Method Used)</b>	<b>Flammable limits</b>	<b>LEL</b>	<b>UEL</b>
Not Applicable		Not Applicable	Not Applicable

Carbon steel products in the solid state are not considered to be a fire hazard.

**Extinguishing Media:** For solid formed product, as appropriate for surrounding fire. A fire involving finely divided particles should be treated as a Class D combustible metal fire.

## Section 5 Fire Fighting Measures – Continued

### Special Fire Fighting Procedures

As with all fires, fire fighters should wear full protective gear including supplied air respirators.

**Unusual Fire & Explosion:** None

## **Section 6 Accidental Release Measures**

**Steps to be Taken in Case Material is Released or Spilled:** Not applicable to carbon steel products in the solid state.

**Waste Disposal Method:** Material wastes should all be recycled. Follow safe solid waste disposal guidelines in accordance with federal state and local regulations.

## **Section 7 Handling and Storage**

**Storage Precautions:** Keep away from incompatible materials.

**Handling Precautions:** Avoid breathing of and contact with fumes and dusts during processing. No specific requirements for solid formed steel product.

## **Section 8 Exposure Controls & Personal Protection**

**Required Ventilation:** Local and/or general exhaust ventilation should be used to keep worker exposures below applicable exposure limits during welding, brazing, grinding, machining, and other processes which may generate airborne contaminants.

**Respiratory Protection:** Respirators are not needed for handling carbon steel products in the solid state. Use a NIOSH/MSHA approved dust/fume respirator if there is overexposure to fume or particulate.

**Protective Gloves:** Suitable for protection against physical injury and skin contact during handling and processing.

**Eye Protection:** Safety glasses or goggles when there are flying particles or high levels of airborne dust or fume. A welding helmet with eye protection should be worn when welding.

## **Section 9 Physical & Chemical Properties**

**Physical State:** Solid

**Color:** Silver-gray

**Odor:** Odorless

**Melting Point:** 3000<sup>0</sup> F

**Vapor Pressure** (mm Hg, @ 68<sup>0</sup>F): Negligible

**Specific Gravity** (H<sub>2</sub>O =1): 7-8

**Evaporation Rate:** Not applicable

**Solubility in Water:** Insoluble

**Freezing Point:** Not applicable

## **Section 10 Stability and Reactivity**

**Stability:** Stable under normal conditions.

**Incompatible:** Acids, bases or strong oxidizing agents.

**Hazardous Decomposition Products:** Extreme heat from fire or processing may produce toxic or irritating airborne particulate, including metal and metallic oxide fumes. Reaction of some metals with water, steam, acids, etc. can evolve hydrogen, which is a highly dangerous fire and explosion hazard.

**Conditions to Avoid:** Contact with incompatible materials. Avoid creating finely divided, concentrated airborne particulates in the presence of ignition sources.

## Section 11 Toxicological Information

**Data not available for the mixture. Only ingredients that are carcinogens that are  $\geq 0.1\%$  in this product or are non-carcinogens that are  $\geq 1.0\%$  are discussed in this section.**

**Iron:** Excessive exposure of eyes to airborne iron oxide fumes or dusts can cause conjunctivitis, choroiditis, and retinitis. Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in development of a benign pneumoconiosis, called siderosis, which is observable via x-ray. Inhalation of excessive concentrations of iron oxide may enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. LD50 (oral, rat) – 30 gm/kg.

**Carbon/Carbon Black:** Inhalation of the dust may cause respiratory irritation. Symptoms may include coughing and difficulty breathing. Eye contact may cause mild irritation and redness. May cause cancer in laboratory animals, but the available information is inadequate to determine if this material can cause cancer in humans.

**Manganese:** Chronic manganese poisoning may result from prolonged inhalation of manganese dust and fumes. The central nervous system is the chief site of damage from the disease, which may result permanent disability. Symptoms include languor, sleepiness, weakness, emotional disturbances, spastic gait, recurring leg cramps, and paralysis. LD50 (oral, rat) – 30 mg/mkg.

**Sulfur Dioxide:** Corrosive and irritating to the skin, eyes, and respiratory tract. Initial symptoms of exposure include nose and throat irritation, becoming steadily worse, suffocating and painful. The irritation extends to the chest causing a cough reflex. Other symptoms include headache, general discomfort and anxiety.

**Sulfur:** Inhalation exposure may cause coughing, sneezing or labored breathing if large amounts are inhaled. Eye contact may cause irritation, redness and pain. Prolonged overexposure to sulfur dust can produce possible skin sensitization and permanent eye damage. Prolonged inhalation can cause irritation of the mucous membranes.

**Nickel:** Nickel fumes are respiratory irritants and may cause pneumonitis. Exposure to nickel and its compounds may result in the development of a dermatitis known as “nickel itch” in sensitized individuals. The first symptom is usually itching, which occurs up to 7 days before skin eruption occurs. Nickel sensitivity, once acquired, appears to persist indefinitely. Nickel and certain nickel compounds have been listed by NTP as being reasonably anticipated to be carcinogens. IARC has listed nickel compounds within Group 1 and nickel within group 2B. Nickel is not regulated as a carcinogen by OSHA.

**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 low toxicity; however, Hexavalent Chromium (Cr VI) can be found in welding, cutting or high temperature decomposition by-products. Cr VI is listed as Confirmed Human Carcinogen by ACGIH, IARC Group 1 and OSHA.

**Vanadium:** Acute and chronic exposure can give rise to conjunctivitis, rhinitis, reversible irritant of the respiratory tract, and to bronchitis, bronchia spasms, and asthma-like diseases in more severe cases. Vanadium compounds act chiefly as an irritant to the conjunctiva and respiratory tract.

**Molybdenum Metal:** The airborne exposure limit is based on lower respiratory tract irritation. Metal and insoluble compounds are not listed as cancer agents.

## Section 12 Ecological Information

Not applicable for solid steel products. Finely divided product, based on its components, will be hazardous to fish, animals, plants and the environment if released, the degree of which would depend on the particle size and quantity released. This material may persist in the environment for long periods, based upon its corrosion resistant, insoluble, and non-biodegradable properties. As with all foreign substances do not allow to enter the storm drainage systems.

## Section 13 Disposal Considerations

Metal wastes should be recycled. Follow safe solid waste disposal guidelines in accordance with federal, state and local regulations. For proper disposal, an assessment must be completed to determine the proper and permissible waste management options permissible under applicable rules, regulations, and/or laws governing your location.

## Section 14 Transport Information

Hazardous materials description/proper shipping name: Not applicable for solid formed product.

Hazard Class: Not applicable for solid formed product.

Product Identification No.: Not applicable for solid formed product.

## Section 15 Regulatory Information

**SARA Title III Section 302 Extremely hazardous substances:** No components are listed as extremely hazardous substances.

**SARA Title III Section 313 Reportable Substances:** Manganese, chromium, nickel, zinc, and lead are subject to reporting requirements. All other components are below the *de minimis* levels.

**CERCLA Hazardous Substances:** Phosphorous (reportable quantity 1 lb.), copper (reportable quantity 5000 lbs.), Nickel (reportable quantity 100 lbs.), chromium (reportable quantity 5000 lbs.), vanadium (reportable quantity 1000 lbs.), lead (reportable quantity 10 lbs.), and zinc (reportable quantity 1000 lbs.). Copper, nickel, chromium, lead and zinc require CERCLA reporting only if diameter of particles released is less than 100 micrometers.

**Pennsylvania R-T-K List:** Listed components (greater than 0.1% by weight): iron oxide, carbon black, manganese (E), phosphorous (E), sulfur, silicon, copper, nickel (E,S), chromium (E,S), vanadium (E), molybdenum, tin, aluminum (E). E-environmental hazard, S-special hazardous substance.

**New Jersey R-T-K Environmental Hazardous substance list:** Listed components – carbon black, manganese, phosphorous, sulfur dioxide, copper, nickel, chromium, vanadium, aluminum, barium, lead, and zinc.

**California Proposition 65:**

**"WARNING:** This product contains chemicals known to the State of California to cause cancer."

**"WARNING:** This product contains chemicals known to the State of California to cause birth defects or other reproductive harm."

- Carbon black: Cancer
- Chromium Hexavalent: Cancer and developmental female, male
- Lead: Cancer and developmental female, male
- Nickel: Cancer
- Vanadium Pentoxide: Cancer

## Section 16 Other Information

**HMIS Hazard Rating (for solid formed product)** *Health – 1\* Flammability – 0 Physical Hazard – 0* Personal Protective Equipment – D (face/eye protection, gloves, and apron for welding, cutting, and other similar processes). (0- Insignificant, 1- Slight, 2- Moderate, 3- High, 4- Extreme, \* Chronic hazards)

**NFPA Rating (for solid formed product):** No signage requirement

## References

- 1) TLV's Threshold Limit Values and Biological Exposure Indices for 2010. American Conference of Governmental Industrial Hygienists, 2010.
- 2) Air Contaminants, OSHA regulations CFR 29 1910.1000
- 3) Toxnet current online publications
- 4) Material Safety Data Sheets and Cheminfo, Canadian Centre for Occupational Health and Safety
- 5) SAX'S Dangerous Properties of Industrial Materials

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