

1. Identification

Product identifier	Hot Rolled Carbon Steel	
Other means of identification	None.	
Recommended use	Steel Fabricated Parts.	
Recommended restrictions	None known.	
Manufacturer/Importer/Supplier/Distributor information		
Company name	Steel Dynamics, Inc.	
Address	4500 County Road 59 Butler, IN 46721 US US	
Telephone	Telephone	260-868-8000
E-mail	Not available.	
Contact person	Safety Department	
Emergency phone number	Emergency Telephone	800-424-9300

2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.

Label elements

Hazard symbol	None.
Signal word	None.
Hazard statement	None.

Precautionary statement

Prevention	Avoid creating dust.
Response	Wash skin with soap and water.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information

In its manufactured and shipped state, this product is considered non-hazardous. Processing may generate hazardous fumes and dusts. Welding, cutting and metalizing can generate ozone. Ozone can cause irritation of eyes, nose and respiratory tract.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Iron	7439-89-6	90-100
Manganese	7439-96-5	0-2
Chromium	7440-47-3	0-1
Silicon	7440-21-3	0-1
Nickel	7440-02-0	0-0.4
Vanadium	7440-62-2	0-0.2
Iron oxide**	1309-37-1	0

The product is an alloy. May liberate hazardous oxides such as iron oxides and vanadium pentoxide at temperatures above the melting point. Oil or chrome coating may be used.

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.
**Iron oxide and vanadium pentoxide are formed at temperatures above the melting point.

4. First-aid measures

Inhalation

In case of inhalation of fumes from heated product: Move into fresh air and keep at rest. Get medical attention if symptoms persist. If breathing is difficult, give oxygen. If breathing stops, provide artificial respiration.

Skin contact

Wash skin with soap and water. In case of burns with hot metal, rinse with plenty of cold water. If burns are severe, consult a physician. If skin irritation or an allergic skin reaction develops, get medical attention.

Eye contact

Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses. Get medical attention promptly if symptoms persist or occur after washing.

Ingestion

Solid steel: Not applicable. Dust: Get medical attention if any discomfort continues.

Most important symptoms/effects, acute and delayed

High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Typical symptoms last 12 to 48 hours and are characterized by metallic taste in the mouth, dryness, and irritation of the throat, followed by weakness, muscle pain, fever, and chills.

5. Fire-fighting measures

Suitable extinguishing media

No unusual fire or explosion hazards noted. Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media

None known.

Specific hazards arising from the chemical

At temperatures above the melting point, may liberate fumes of iron, nickel, and zinc oxide.

Special protective equipment and precautions for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions

Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Cold solid metal: No special precautions are necessary beyond normal good hygiene practices. See Section 8 of the SDS for additional personal protection advice when handling this product. Hot metal: Avoid contact with hot material. Wear protective clothing as described in Section 8 of this safety data sheet.

Methods and materials for containment and cleaning up

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

Collect for recycling.

Environmental precautions

No specific precautions.

7. Handling and storage

Precautions for safe handling

Oil coating can make material slippery. Avoid contact with sharp edges and hot surfaces. Use appropriate gloves and tools to ensure safe handling. Use work methods which minimize dust/fume production. Do not breathe fumes and dusts. Follow the recommendations in ANSI Z49.1, Safety in welding and cutting (ANSI=American National Standard Institute). Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store in a dry place. Store away from: Oxidizing agents. Acids.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Chromium (CAS 7440-47-3)	PEL	1 mg/m ³	
Iron oxide** (CAS 1309-37-1)	PEL	10 mg/m ³	Fume.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m ³	Fume.
Nickel (CAS 7440-02-0)	PEL	1 mg/m ³	
Silicon (CAS 7440-21-3)	PEL	5 mg/m ³	Respirable fraction.
		15 mg/m ³	Total dust.
Vanadium pentoxide** (CAS 1314-62-1)	Ceiling	0.5 mg/m ³	Respirable dust.
		0.1 mg/m ³	Fume.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Chromium (CAS 7440-47-3)	TWA	0.5 mg/m ³	
Iron oxide** (CAS 1309-37-1)	TWA	5 mg/m ³	Respirable fraction.
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m ³	Inhalable fraction.
Vanadium pentoxide** (CAS 1314-62-1)	TWA	0.05 mg/m ³	Inhalable fraction.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Chromium (CAS 7440-47-3)	TWA	0.5 mg/m ³	
Iron oxide** (CAS 1309-37-1)	TWA	5 mg/m ³	Dust and fume.
Manganese (CAS 7439-96-5)	STEL	3 mg/m ³	Fume.
	TWA	1 mg/m ³	Fume.
Nickel (CAS 7440-02-0)	TWA	0.015 mg/m ³	
Silicon (CAS 7440-21-3)	TWA	5 mg/m ³	Respirable.
		10 mg/m ³	Total
Vanadium (CAS 7440-62-2)	STEL	3 mg/m ³	
	TWA	1 mg/m ³	
Vanadium pentoxide** (CAS 1314-62-1)	Ceiling	0.05 mg/m ³	Fume.
		0.05 mg/m ³	Dust.

Biological limit values	No biological exposure limits noted for the ingredient(s).
Exposure guidelines	**Iron oxide and vanadium pentoxide are formed at temperatures above the melting point.
Appropriate engineering controls	Adequate ventilation should be provided so that exposure limits are not exceeded. Use local exhaust when welding, burning, sawing, brazing, grinding or machining to prevent excessive dust or fume exposure.
Individual protection measures, such as personal protective equipment	
Eye/face protection	Use of safety glasses or goggles is required for welding, burning, sawing, brazing, grinding or machining operations. In addition to safety glasses or goggles, a welding helmet with appropriate shaded shield is required during welding, burning, or brazing. A face shield is recommended, in addition to safety glasses or goggles, during sawing, grinding, or machining.
Skin protection	
Hand protection	Wear protective gloves.
Other	Wear suitable protective clothing.
Respiratory protection	Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.
Thermal hazards	When material is heated, wear gloves to protect against thermal burns. Thermally protective apron and long sleeves are recommended when volume of hot material is significant.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Observe any medical surveillance requirements.

9. Physical and chemical properties

Appearance

Physical state	Solid.
Form	Rolled steel.
Color	Metallic gray.

Odor None.

Odor threshold Not applicable.

pH Not applicable.

Melting point/freezing point 2750 °F (1510 °C) / Not applicable.

Initial boiling point and boiling range Not applicable.

Flash point Not applicable.

Evaporation rate Not applicable.

Flammability (solid, gas) Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not applicable.

Flammability limit - upper (%) Not applicable.

Explosive limit - lower (%) Not applicable.

Explosive limit - upper (%) Not applicable.

Vapor pressure Not applicable.

Vapor density Not applicable.

Relative density Not available.

Solubility(ies)

Solubility (water) Not applicable.

Partition coefficient (n-octanol/water) Not applicable.

Auto-ignition temperature Not applicable.

Decomposition temperature Not applicable.

Viscosity Not applicable.

10. Stability and reactivity

Reactivity Stable at normal conditions.

Chemical stability This product is stable under expected conditions of use.

Possibility of hazardous reactions Will not occur.

Conditions to avoid Contact with incompatible materials.

Incompatible materials Strong acids. Oxidizing agents.

Hazardous decomposition products At elevated temperatures: Acrid fumes. Metallic fumes.
Strong Acid Contact: Hydrogen.

11. Toxicological information

Information on likely routes of exposure

Inhalation No inhalation hazard under normal conditions. Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. Inhalation of dust (generated at high temperatures only) or oil mist from this product may cause mild irritation of the upper respiratory tract. Fumes released during processing of mineral oil treated steel surface may cause irritation to the respiratory system. High concentrations: Repeated and prolonged overexposure to oil mists may result in droplet deposition, oil granuloma formation, inflammation and increased incidence of infection in the respiratory tract.

Skin contact Under normal conditions of intended use, this material does not pose a risk to health. Dust may irritate skin. Oil coating may cause temporary irritation to skin. Skin contact may aggravate an existing dermatitis. Contact with hot material can cause thermal burns which may result in permanent damage.

Eye contact Under normal conditions of intended use, this material does not pose a risk to health. Contact with hot material can cause thermal burns which may result in permanent damage. Grinding and sanding this product may generate dust. Dust may irritate the eyes.

Ingestion Solid steel: Not relevant, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting.

Symptoms related to the physical, chemical and toxicological characteristics Exposed individuals may experience eye tearing, redness, and discomfort. May dry the skin leading to discomfort and dermatitis. Prolonged contact may cause redness, irritation and cracking. High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Typical symptoms last 12 to 48 hours and are characterized by metallic taste in the mouth, dryness, and irritation of the throat, followed by weakness, muscle pain, fever, and chills. Exposed individuals may experience eye tearing, redness, and discomfort.

Information on toxicological effects

Acute toxicity Processing may generate hazardous fumes and dusts. Welding, cutting and metalizing can generate ozone. Ozone can cause irritation of eyes, nose and respiratory tract.

Components	Species	Test Results
Iron (CAS 7439-89-6)		
Acute		
<i>Inhalation</i>		
LC50	Rat	250 mg/m3, 6 hours, (Carbonyl iron)
<i>Oral</i>		
LD50	Rat	7500 mg/kg
Silicon (CAS 7440-21-3)		
Acute		
<i>Inhalation</i>		
LC50	Rat	> 2.08 mg/l, 4 hours
<i>Oral</i>		
LD50	Rat	3160 mg/kg

Skin corrosion/irritation Dust may irritate skin.

Serious eye damage/eye irritation Dust may irritate the eyes.

Respiratory or skin sensitization

Respiratory sensitization Not relevant, due to the form of the product. Contains nickel: May cause allergy or asthma symptoms or breathing difficulties if inhaled. This ingredient is bound within the product and release is not expected under normal condition.

Skin sensitization Contains nickel: May cause an allergic skin reaction. Mineral oil: Prolonged or repeated contact with skin may cause redness, itching, irritation, eczema/chapping and oil acne. This ingredient is bound within the product and release is not expected under normal condition.

Germ cell mutagenicity Not relevant, due to the form of the product. May liberate hazardous vanadium pentoxide at temperatures above the melting point. Vanadium pentoxide is classified as suspected of causing genetic defects. This ingredient is bound within the product and release is not expected under normal condition.

Carcinogenicity Not relevant, due to the form of the product. May liberate hazardous oxides such as iron oxides and vanadium pentoxide at temperatures above the melting point. Inhalation of high concentrations of iron oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. Vanadium pentoxide is classified as possibly carcinogenic to humans (Group 2B) by IARC. This ingredient is bound within the product and release is not expected under normal condition.

IARC Monographs. Overall Evaluation of Carcinogenicity

Chromium (CAS 7440-47-3)	3 Not classifiable as to carcinogenicity to humans.
Iron oxide** (CAS 1309-37-1)	3 Not classifiable as to carcinogenicity to humans.
Nickel (CAS 7440-02-0)	2B Possibly carcinogenic to humans.
Vanadium pentoxide** (CAS 1314-62-1)	2B Possibly carcinogenic to humans.

NTP Report on Carcinogens

Nickel (CAS 7440-02-0)	Reasonably Anticipated to be a Human Carcinogen.
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OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity	Not relevant, due to the form of the product. May liberate hazardous vanadium pentoxide at temperatures above the melting point. Vanadium pentoxide is classified as suspected of damaging fertility or the unborn child. This ingredient is bound within the product and release is not expected under normal condition.
Specific target organ toxicity - single exposure	No data available.
Specific target organ toxicity - repeated exposure	Not relevant, due to the form of the product. Contains Manganese: Causes damage to organs (lung) through prolonged or repeated exposure by inhalation. This ingredient is bound within the product and release is not expected under normal condition.
Aspiration hazard	Due to the physical form of the product it is not an aspiration hazard.
Chronic effects	Frequent inhalation of dust over a long period of time increases the risk of developing asthma, chronic lung diseases, and skin irritation. Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to benign pneumoconiosis (siderosis). Exposure to manganese fume/dust can affect the central nervous system (apathy, drowsiness, weakness and other chronic symptoms such as postural tremors). Pre-existing skin and respiratory conditions including dermatitis, asthma and chronic lung disease might be aggravated by exposure. The ingredients of the alloy are bound within the product and release is not expected under normal conditions.

12. Ecological information

Ecotoxicity	The environmental hazard of the product is considered to be limited.
Persistence and degradability	No data available.
Bioaccumulative potential	No data available on bioaccumulation.
Mobility in soil	Not relevant, due to the form of the product.
Other adverse effects	None known.

13. Disposal considerations

Disposal instructions	Dispose waste and residues in accordance with applicable federal, state, and local regulations.
Hazardous waste code	Not regulated.
Waste from residues / unused products	Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal. Recover and recycle, if practical.
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT	Not regulated as dangerous goods.
IATA	Not regulated as dangerous goods.
IMDG	Not regulated as dangerous goods.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

15. Regulatory information

US federal regulations	Under some use conditions, this material may be considered to be hazardous in accordance with OSHA 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.
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TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Chromium (CAS 7440-47-3)	LISTED
Manganese (CAS 7439-96-5)	LISTED

Nickel (CAS 7440-02-0) LISTED
Vanadium pentoxide** (CAS 1314-62-1) LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity	Threshold planning quantity	Threshold planning quantity, lower value	Threshold planning quantity, upper value
Vanadium pentoxide**	1314-62-1	1000		100 lbs	10000 lbs

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Manganese	7439-96-5	0-2
Chromium	7440-47-3	0-1
Nickel	7440-02-0	0-0.4

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Chromium (CAS 7440-47-3)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations WARNING: This product contains chemical(s) known to the State of California to cause cancer.

US. Massachusetts RTK - Substance List

Chromium (CAS 7440-47-3)
Iron oxide** (CAS 1309-37-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Silicon (CAS 7440-21-3)
Vanadium (CAS 7440-62-2)
Vanadium pentoxide** (CAS 1314-62-1)

US. New Jersey Worker and Community Right-to-Know Act

Chromium (CAS 7440-47-3)
Iron oxide** (CAS 1309-37-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Silicon (CAS 7440-21-3)
Vanadium (CAS 7440-62-2)
Vanadium pentoxide** (CAS 1314-62-1)

US. Pennsylvania Worker and Community Right-to-Know Law

Chromium (CAS 7440-47-3)
Iron oxide** (CAS 1309-37-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Silicon (CAS 7440-21-3)
Vanadium (CAS 7440-62-2)
Vanadium pentoxide** (CAS 1314-62-1)

US. Rhode Island RTK

Chromium (CAS 7440-47-3)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Vanadium (CAS 7440-62-2)
Vanadium pentoxide** (CAS 1314-62-1)

US. California Proposition 65

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Nickel (CAS 7440-02-0)

Vanadium pentoxide** (CAS 1314-62-1)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 13-January-2015

Revision date -

Version # 01

HMIS® ratings Health: 0
Flammability: 0
Physical hazard: 0

Disclaimer This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment. SDS's for specific coatings are available upon request.