



# MATERIAL SAFETY DATA SHEET

## 1 PRODUCT AND COMPANY IDENTIFICATION

**Product Name:** Galvanneal Steel Sheet Coil

**Manufacturer Name:**  
Steel Dynamics, Inc.  
Flat Roll Division  
4500 County Road 59  
Butler, IN 46721  
Telephone: (260)-868-8000

**Emergency Telephone:**  
(800)-424-9300

**Intended Use:** Steel Fabricated Parts

**Contact Person:** Safety Department

## 2 HAZARDS IDENTIFICATION

### Emergency Overview

**Physical State:** Solid

**Color:** Gray

**Odor:** None

In its manufactured and shipped state, this product is considered non-hazardous. Processing may generate hazardous fumes and dusts.

### Potential Health Effects

**Inhalation:** No inhalation hazard under normal conditions. Welding, burning, sawing, brazing, grinding or machining operations may generate fumes and dusts of metal oxides. High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Fumes released during processing of mineral oil treated steel surface may cause irritation to the respiratory system.

**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. Exposed individuals may experience eye tearing, redness, and discomfort.

**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. May dry the skin leading to discomfort and dermatitis. Skin contact may aggravate an existing dermatitis. Contact with hot material can cause thermal burns which may result in permanent damage.

**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.

**Chronic Health Effects:** Frequent inhalation of fume/dust over a long period of time increases the risk of developing lung diseases. Contains nickel. May cause sensitization by skin contact. Nickel is

listed by IARC (Group 2B) and NTP. Vanadium pentoxide is classified as possibly carcinogenic to humans (Group 2B) by IARC, may cause adverse reproductive effects and may adversely affect the developing fetus. A residual chrome VI compound from the surface coating is water soluble and is carcinogenic. Chromium VI compounds are regarded as human carcinogens by IARC, NTP, OSHA and ACGIH. Exposure to manganese fume/dust can affect the central nervous system (apathy, drowsiness, weakness and other chronic symptoms such as postural tremors). These ingredients are bound within the product and release is not expected under normal conditions.

**Target Organ(s):** | Skin | Lung | Central nervous system |

**Potential Physical / Chemical Effects:** The dangerous properties of the product are considered limited.

**OSHA Regulatory Status:** Under some use conditions, this material may be considered to be hazardous in accordance with OSHA 29 CFR 1910.1200.

**Environment:** The environmental hazard of the product is considered to be limited.

### 3 COMPOSITION / INFORMATION ON INGREDIENTS

**General Information:** The product is an alloy. The alloy surface is galvanized. Galvanneal coating is an alloy of zinc and iron from the steel substrate. The additional iron causes the coating to be slightly more brittle than standard galvanize coating. As a result, galvanneal coating will sometimes produce a dark powder during processing. This powder is residue from the fractured galvanneal coating. The surface may be passivated with chromic acid leaving residual coating of chrome III and VI compounds. The steel is treated with mineral oil. May liberate hazardous oxides such as iron oxides and vanadium pentoxide at temperatures above the melting point.

Chemical Name	CAS-No.	Concentration*
Iron	7439-89-6	90 - 100%
†Coating(s)	-	< 3%
†Manganese	7439-96-5	0 - 2%
†Chromium	7440-47-3	0 - 1%
†Iron oxide**	1309-37-1	0%
†Silicon	7440-21-3	0 - 1%
†Vanadium pentoxide**	1314-62-1	0%
†Zinc oxide**	1314-13-2	0%
†Nickel	7440-02-0	0 - 0.4%
Vanadium	7440-62-2	0 - 0.2%

\* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

† This chemical is hazardous according to OSHA/WHMIS criteria.

\*\*Iron oxide and vanadium pentoxide are formed at temperatures above the melting point. \*\*Zinc oxide fumes may be formed during burning, cutting, or welding.

### 4 FIRST AID MEASURES

**Inhalation:** In case of inhalation of dusts or 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.

**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 occur after washing.

**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.

**Ingestion:** Solid steel: Not Applicable Dust: Get medical attention if any discomfort continues.

## 5 FIRE-FIGHTING MEASURES

**Extinguishing Media:** Use fire-extinguishing media appropriate for surrounding materials.

**Unsuitable Extinguishing Media:** Not applicable.

**Special Fire Fighting Procedures:** Use standard firefighting procedures and consider the hazards of other involved materials.

**Unusual Fire & Explosion Hazards:** No unusual fire or explosion hazards noted.

**Hazardous Combustion Products:** Acrid fumes, Carbon Dioxide, Carbon Monoxide, Nitrogen Oxides, Sulfur Oxides, inorganic compounds

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

**Flammability Class:** NFPA Rating Fire = 0. Materials that will not burn.

## 6 ACCIDENTAL RELEASE MEASURES

**Personal Precautions:** Cold solid metal: No special precautions are necessary beyond normal good hygiene practices. See Section 8 of the MSDS 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.

**Spill Cleanup Methods:** Collect for recycling.

**Environmental Precautions:** No specific precautions.

**Notification Procedures:** In the event of accidental release, notify relevant authorities in accordance with all applicable regulations.

## 7 HANDLING AND STORAGE

**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. Observe safety measures suited to the coating(s) when handling, cutting or melting. Follow the recommendations in ANSI Z49.1, Safety in welding and cutting (ANSI=American National Standard Institute).

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

<b>8</b>	<b>EXPOSURE CONTROLS / PERSONAL PROTECTION</b>
----------	--

**Exposure Limits:**

Chemical Name	Source	Type	Exposure Limits	Notes
Chromium	NIOSH Guide	IDLH	250 mg/m <sup>3</sup>	
Chromium	US. OSHA Table Z-1	TWA	1 mg/m <sup>3</sup>	as Cr
Iron oxide** (Respirable fraction.)	ACGIH	TWA	5 mg/m <sup>3</sup>	as Fe
Iron oxide**	NIOSH Guide	IDLH	2500 mg/m <sup>3</sup>	as Fe
Iron oxide** (Fume.)	US. OSHA Table Z-1	TWA	10 mg/m <sup>3</sup>	
Manganese	ACGIH	TWA	0.2 mg/m <sup>3</sup>	as Mn
Manganese	NIOSH Guide	IDLH	500 mg/m <sup>3</sup>	as Mn
Manganese (Fume.)	US. OSHA Table Z-1	Ceiling	5 mg/m <sup>3</sup>	as Mn
Nickel (Inhalable fraction.)	ACGIH	TWA	1.5 mg/m <sup>3</sup>	as Ni
Nickel	NIOSH Guide	IDLH	10 mg/m <sup>3</sup>	as Ni
Nickel	US. OSHA Table Z-1	TWA	1 mg/m <sup>3</sup>	as Ni
Silicon	ACGIH	TWA	10 mg/m <sup>3</sup>	
Silicon (Respirable fraction.)	US. OSHA Table Z-1	TWA	5 mg/m <sup>3</sup>	
Silicon (Total dust.)	US. OSHA Table Z-1	TWA	15 mg/m <sup>3</sup>	
Vanadium pentoxide** (Respirable fraction.)	ACGIH	TWA	0.05 mg/m <sup>3</sup>	as V2O5
Vanadium pentoxide**	NIOSH Guide	IDLH	35 mg/m <sup>3</sup>	as V2O5
Vanadium pentoxide** (Fume.)	US. OSHA Table Z-1	Ceiling	0.1 mg/m <sup>3</sup>	as V2O5
Zinc oxide** (Respirable fraction.)	ACGIH	TWA	2 mg/m <sup>3</sup>	
Zinc oxide** (Respirable fraction.)	ACGIH	STEL	10 mg/m <sup>3</sup>	
Zinc oxide**	NIOSH Guide	IDLH	500 mg/m <sup>3</sup>	
Zinc oxide** (Fume.)	US. OSHA Table Z-1	TWA	5 mg/m <sup>3</sup>	
Zinc oxide** (Respirable fraction.)	US. OSHA Table Z-1	TWA	5 mg/m <sup>3</sup>	

Consult Canadian Provincial Regulations and/or Mexican Regulations on exposure limits, if applicable.

\*\*Iron oxide and vanadium pentoxide are formed at temperatures above the melting point. \*\*Zinc oxide fumes may be formed during burning, cutting, or welding.

**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.

**Respiratory Protection:** Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

**Eye 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.

**Hand Protection:** Wear protective gloves. When material is heated, wear gloves to protect against thermal burns. While handling product and/or steel packing material wear cut resistant gloves and sleeves for laceration protection.

**Skin Protection:** Wear suitable protective clothing. Thermally protective apron or coat with long sleeves are recommended when the volume of hot material is significant.

**Hygiene Measures:** 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.

**Environmental Exposure Controls:** Environmental manager must be informed of all major releases.

<b>9</b>	<b>PHYSICAL AND CHEMICAL PROPERTIES</b>
----------	---

**Color:** Gray

**Odor:** None

**Odor Threshold:** Not applicable.

**Physical State:** Solid

**pH:** Not applicable

**Melting Point:** 1510°C (2750°F)

**Freezing Point:** Not applicable.

**Boiling Point:** Not applicable.

**Flash Point:** Not applicable.

**Evaporation Rate:** Not applicable.

**Flammability Limit - Upper (%):** Not applicable.

**Flammability Limit - Lower (%):** Not applicable.

**Vapor Pressure:** Not applicable.

**Vapor Density (Air=1):** Not applicable.

**Specific Gravity:** No data available.

**Solubility in Water:** Insoluble

**Solubility (Other):** No data available.

**Partition Coefficient (n-Octanol/water):** Not applicable.

**Autoignition Temperature:** Not applicable.

**Decomposition Temperature:** No data available.

<b>10</b>	<b>STABILITY AND REACTIVITY</b>
-----------	---------------------------------

**Stability:** This product is stable under expected conditions of use.

**Conditions to Avoid:** Avoid contact with acids and oxidizing substances.

**Incompatible Materials:** Strong Acids. Oxidizing agents.

**Hazardous Decomposition Products:**

At Elevated Temperatures:	Acrid fumes, Carbon Dioxide, Carbon Monoxide, Metal oxides, Nitrogen Oxides, Sulfur Oxides, inorganic compounds
Strong Acid Contact:	Hydrogen

**Possibility of Hazardous Reactions:** Will not occur.

<b>11</b>	<b>TOXICOLOGICAL INFORMATION</b>
-----------	----------------------------------

**Specified Substance(s)**

**Acute Toxicity:**

Chemical Name	Test Results
Manganese	Oral LD50 (Rat): 9 g/kg
Silicon	Oral LD50 (Rat): 3160 mg/kg

**Other Acute:** Mineral oil: Prolonged or repeated contact with skin may cause redness, itching, irritation, eczema/chapping and oil acne. High concentration: 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. High concentrations of freshly-formed fumes of zinc oxide can produce symptoms of metal fume fever.

**Chronic Toxicity:** Contains nickel. May cause sensitization by skin contact. Nickel is listed by IARC (Group 2B) and NTP. Vanadium pentoxide is classified as possibly carcinogenic to humans (Group 2B) by IARC, may cause adverse reproductive effects and may adversely affect the developing fetus. A residual chrome VI compound from the surface coating is water soluble and is carcinogenic. Chromium VI compounds are regarded as human carcinogens by IARC, NTP, OSHA and ACGIH. Exposure to manganese fume/dust can affect the central nervous system (apathy, drowsiness, weakness and other chronic symptoms such as postural tremors).

**Listed Carcinogens:**

Chemical Name	IARC	NTP	OSHA	ACGIH
Nickel	2B	Listed	Not Listed	A5
Vanadium pentoxide**	2B	Not Listed	Not Listed	A4
Iron oxide**	3	Not Listed	Not Listed	A4
Chromium	3	Not Listed	Not Listed	A4

IARC: 1 = Carcinogenic to Humans; 2A = Probably Carcinogenic to Humans; 2B = Possibly Carcinogenic to Humans; 3 = Not classifiable as to carcinogenicity to humans; 4 = Probably not carcinogenic to humans; Not listed = Not evaluated by IARC.

ACGIH: A1 = Confirmed Human Carcinogen; A2 = Suspected Human Carcinogen; A3 = Confirmed Animal Carcinogen; A4 = Not classifiable as a human carcinogen; A5 = Not suspected to be a human carcinogen; Not listed = Not evaluated by ACGIH.

**Product Information**

**Acute Toxicity:** High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Inhalation of dust (generated at high temperatures only) or oil mist from this product may cause mild irritation of the upper respiratory tract. Prolonged contact may cause redness, irritation and cracking. Welding, cutting and metalizing can generate ozone. Ozone can cause irritation of eyes, nose and respiratory tract.

**Chronic Toxicity:** Frequent inhalation of fume/dust over a long period of time increases the risk of developing lung diseases. The product contains a small amount of sensitizing substance which may provoke an allergic reaction among sensitive individuals in contact with skin. The ingredients of the alloy are bound within the product and release is not expected under normal conditions.

**12 ECOLOGICAL INFORMATION**

**Ecotoxicity:** No data available.

**Mobility:** Not relevant, due to the form of the product.

**Persistence and Degradability:** No data available.

**Bioaccumulation Potential:** No data available on bioaccumulation.

**Other Adverse Effects:** None known.

**13 DISPOSAL CONSIDERATIONS**

**General Information:** Dispose waste and residues in accordance with applicable federal, state, and local regulations.

**Disposal Methods:** 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 reclaim or recycle, if practical.

**Container:** Since emptied containers retain product residue, follow label warnings even after container is emptied.

**14 TRANSPORT INFORMATION**

**DOT** Not regulated.

**TDG** Not regulated.

**IATA** Not regulated.

**IMDG** Not regulated.

**15 REGULATORY INFORMATION**

**Canadian Controlled Products Regulations:** This product has been classified according to the hazard criteria of the Canadian Controlled Products Regulations, Section 33, and the MSDS contains all required information.

**WHMIS Classification:** D2A

**Mexican Dangerous Statement:** Under some use conditions, this material may be considered to be hazardous in accordance with Mexican regulations.

**Inventory Status**

**This product or all components are listed on the following inventory:** DSL, TSCA

**US Regulations**

**CERCLA Hazardous Substance List (40 CFR 302.4):** For metals, the stated Reportable Quantity (RQ) applies to particles smaller than 100 micrometers.

Chemical Name	RQ
Vanadium pentoxide**	1000 lbs
Zinc oxide**	-
Chromium	5000 lbs
Manganese	-
Nickel	100 lbs

- : No reportable quantity.

### **SARA Title III**

**Section 302 Extremely Hazardous Substances (40 CFR 355, Appendix A):**

Chemical Name	RQ	TPQ
Vanadium pentoxide**	1000 lbs	

**Section 311/312 (40 CFR 370):**

Acute (Immediate)     Chronic (Delayed)     Fire     Reactive     Pressure Generating

**Section 313 Toxic Release Inventory (40 CFR 372):**

Chemical Name	CAS-No.	Concentration
Zinc oxide**	1314-13-2	0%
Chromium	7440-47-3	0 - 1%
Nickel	7440-02-0	0 - 0.4%
Vanadium pentoxide**	1314-62-1	0%
Manganese	7439-96-5	0 - 2%

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

Not regulated.

**Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3):** Vanadium pentoxide\*\*

**Drug Enforcement Act:** Not regulated.

### **TSCA:**

**TSCA Section 4(a) Final Test Rules & Testing Consent Orders:** Not regulated.

**TSCA Section 5(a)(2) Final Significant New Use Rules (SNURs) (40CFR 721, Subpt. E):** Not regulated.

**TSCA Section 5(e) PMN-Substance Consent Orders:** Not regulated.

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D):** Not regulated.

### **State Regulations**

**California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):** Nickel; Vanadium pentoxide\*\*



**Massachusetts Right-To-Know List:** Chromium; Iron oxide\*\*; Manganese; Nickel; Vanadium pentoxide\*\*; Zinc oxide\*\*

**Michigan Critical Materials List (Michigan Natural Resources and Environmental Protection Act (Act. 451 of 1994)):** Not regulated.

**Minnesota Hazardous Substances List:** Chromium; Iron oxide\*\*; Manganese; Nickel; Vanadium pentoxide\*\*; Zinc oxide\*\*

**New Jersey Right-To-Know List:** Chromium; Iron oxide\*\*; Manganese; Nickel; Vanadium pentoxide\*\*; Zinc oxide\*\*

**Pennsylvania Right-To-Know List:** Chromium; Iron oxide\*\*; Manganese; Nickel; Vanadium pentoxide\*\*; Zinc oxide\*\*

**Rhode Island Right-To-Know List:** Chromium; Iron oxide\*\*; Manganese; Nickel; Vanadium pentoxide\*\*; Zinc oxide\*\*

<b>16</b>	<b>OTHER INFORMATION</b>
-----------	--------------------------

### HAZARD RATINGS

	Health Hazard	Fire Hazard	Instability	Special Hazard
<b>NFPA</b>	0	0	0	0

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe

NFPA Label colored diamond code: Blue - Health; Red - Flammability; Yellow - Instability; White - Special Hazards

	Health Hazard	Flammability	Physical Hazard	Personal Protection
<b>HMIS</b>	2*	0	0	X

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe \* - Chronic Health Effect

Personal Protection codes: X - Specialized Handling

HMIS Label colored bar code: Blue - Health; Red - Flammability; Orange - Physical Hazards; White - Special

**This MSDS contains revisions in the following section(s):** 15, 16.

**Issue Date:** 12-Sep-2007

**Supersedes Date:** 12-Sep-2007

**SDS No.:** 1005612

**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. MSDS's for specific coatings are available upon request.