

Section 1 – Identification

1(a) Product Identifier used on Label: 55% Aluminum-Zinc Carbon Steel Sheet

1(b) Other means of identification: None

1(c) Recommended use of the chemical and restrictions on use: Steel fabricated parts. No known restrictions.

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

Steel Dynamics, Inc.	Steel Dynamics, Inc.
Flat Roll Group	Flat Roll Group
Butler Division	Columbus Division
4500 County Road 59	1945 Airport Road
Butler, IN 46721	Columbus, MS 39701
Phone: (260) 868-8000	Phone: (622) 245-4200

1(e) Emergency Phone Number: (800) 424-9300 (CHEMTREC)

Section 2 – Hazard(s) Identification

2(a) Classification of the chemical: 55% Aluminum-Zinc Carbon Steel Sheet 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, 55% Aluminum-Zinc Carbon Steel Sheet 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 – 1B Reproductive Toxicity - 2 Specific Target Organ Toxicity (STOT) Repeat Exposure - 1	DANGER	May cause cancer. May damage fertility or the unborn child. Causes damage to lungs through prolonged or repeated inhalation exposure. May cause an allergic skin reaction. May cause respiratory irritation. Causes eye irritation. Harmful if swallowed.
	Acute Toxicity-Oral – 4 Skin Sensitization - 1 STOT Single Exposure - 3		
NA	Eye Irritation - 2B		

Precautionary Statement(s):

Prevention	Response	Storage/Disposal
Do not breathe dusts / fume / gas / mist. 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 exposed, concerned or feel unwell: Get medical advice/attention or call a poison center. If inhaled: Remove person to fresh air and keep comfortable for breathing. 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 on skin: Wash with plenty of water. If irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. If swallowed: Rinse mouth.	Dispose of contents in accordance with federal, state and local regulations. Store locked up.

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	90-100
Manganese	7439-96-5	231-105-1	0-2
Chromium	7440-47-3	231-157-5	0-1
Silicon	7440-21-3	231-130-8	0-1
Nickel	7440-02-0	231-111-4	0-0.4

Vanadium	7440-62-2	231-171-1	0-0.2
3(a-c) Chemical name, common name (synonyms), CAS number and other identifiers, and concentration (continued):			
Chemical Name	CAS Number	EC Number	% weight
Metallic Coating (<0.1% of total weight)			
Zinc	7440-66-6	231-175-3	≈43.5
Aluminum	7429-90-5	231-072-3	≈55
Silicon	7440-21-3	231-130-8	≈1.5
EC - European Community CAS - Chemical Abstract Service			
<ul style="list-style-type: none"> Product surface may be treated with small amounts of corrosion-inhibiting oil that may contain mineral oil, and may be passivated with chromic acid leaving residual coating of chromium III or VI compounds or coated with acrylic coating based on customer specifications. Contact facility for further information. 			

Section 4 – First-aid Measures

4(a) Description of necessary measures:

- Inhalation: 55% Aluminum-Zinc Carbon Steel Sheet** 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: 55% Aluminum-Zinc Carbon Steel Sheet** as sold/shipped is not a likely form of exposure. However, during further processing (welding, grinding, burning, etc.), if in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue Rinsing. If eye irritation persists: Get medical advice attention. If exposed, concerned or feel unwell: Get medical advice/attention.
- Skin Contact:** If on skin: Wash thoroughly after handling. Wash with plenty of water. If irritation or rash occurs: Get medical advice/attention. Take off and wash contaminated clothing before reuse. If exposed, concerned or feel unwell: Get medical advice/attention.
- Ingestion: 55% Aluminum-Zinc Carbon Steel Sheet** 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: 55% Aluminum-Zinc Carbon Steel Sheet** as sold/shipped is not likely to present an acute or chronic health effect.
 - Eye: 55% Aluminum-Zinc Carbon Steel Sheet** steel as sold/shipped is not likely to present an acute or chronic health effect.
 - Skin: 55% Aluminum-Zinc Carbon Steel Sheet** as sold/shipped is not likely to present an acute or chronic health effect.
 - Ingestion: 55% Aluminum-Zinc Carbon Steel Sheet** 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 **55% Aluminum-Zinc Carbon Steel Sheet** as sold/shipped. Use extinguishers appropriate for surrounding materials.

5(b) **Specific Hazards arising from the chemical:** Not Applicable for **55% Aluminum-Zinc Carbon Steel Sheet** 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 **55% Aluminum-Zinc Carbon Steel Sheet** 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 **55% Aluminum-Zinc Carbon Steel Sheet** 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 **55% Aluminum-Zinc Carbon Steel Sheet** 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): 55% Aluminum-Zinc Carbon Steel Sheet as sold/shipped in its physical form does not present an inhalation, ingestion or contact hazard, nor would any of the following exposure data apply. However, operations such as burning, welding (high temperature), sawing, brazing, machining, grinding, etc. may produce fumes and/or particulates. The following exposure limits are offered as reference for an experienced industrial hygienist to review.

Ingredients	OSHA PEL ¹	ACGIH TLV ²	NIOSH REL ³	IDLH ⁴
Iron	10 mg/m ³ (as iron oxide fume)	5.0 mg/m ³ (as iron oxide dust and fume)	5.0 mg/m ³ (as iron oxide dust and fume)	2,500 mg Fe/m ³
Manganese	(C) 5.0 mg/m ³ (as Fume & Mn compounds)	0.2 mg/m ³	(C) 5.0 mg/m ³ 1.0 mg/m ³ (as fume) (STEL) 3.0 mg/m ³	500 mg Mn/m ³
Chromium	0.5 mg/m ³ (as Cr II & III, inorganic compounds) 1.0 mg/m ³ (as Cr, metal) 0.005 mg/m ³ (as Cr VI, inorganic compounds & certain water insoluble) "AL" 0.0025 mg/m ³ (as Cr VI, inorganic compounds & certain water insoluble)	0.5 mg/m ³ (as Cr III, inorganic compounds) 0.5 mg/m ³ (as Cr, metal) 0.05 mg/m ³ (as Cr VI, inorganic compounds) 0.01 mg/m ³ (as Cr VI, inorganic compounds & certain water insoluble)	0.5 mg/m ³ (as Cr II & III, inorganic compounds) 0.5 mg/m ³ (as Cr, metal) 0.001 mg/m ³ (as Cr VI, inorganic compounds & certain water insoluble)	250 mg/m ³ (as Cr II & metal) 25 mg/m ³ (as Cr III) 15 mg/m ³ (as Cr VI)
Silicon	15 mg/m ³ (total dust, PNOR ⁵) 5.0 mg/m ³ (as respirable fraction ⁶ , PNOR)	10 mg/m ³	10 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable dust)	NE
Nickel	1.0 mg/m ³ (as Ni metal & insoluble compounds)	1.5 mg/m ³ (as inhalable fraction ⁷ Ni metal) 0.2 mg/m ³ (as inhalable fraction Ni inorganic only insoluble and soluble compounds)	0.015 mg/m ³ (as Ni metal & insoluble and soluble compounds)	10 mg/m ³ (as Ni)
Vanadium	"C" 0.5 mg/m ³ (respirable dust, V ₂ O ₅)	0.05 mg/m ³ (as inhalable fraction)	"C" 0.05 mg/m ³ (15 min)	35 mg/m ³ (as V)
Aluminum	15 mg/m ³ (as total dust, PNOR) 5.0 mg/m ³ (as respirable fraction, PNOR)	10 mg/m ³ (as metal dust) 5.0 mg/m ³ (as welding fume)	10 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable dust)	NE
Zinc	5.0 mg/m ³ (as zinc oxide fume) 15 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable fraction)	2.0 mg/m ³ (as zinc oxide)	10 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable dust)	NE

NE - None Established

1. OSHA Permissible Exposure Limits (PELs) 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 Peak is defined as the acceptable maximum peak for a maximum duration above the ceiling concentration for an eight-hour shift. A skin notation refers to the potential significant contribution to the overall exposure by the cutaneous route, either by contact with vapors or, of probable greater significance, by direct skin contact with the substance. 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.
2. Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. A Short Term Exposure Limit (STEL) is defined as the maximum concentration to which workers can be exposed for a short period of time (15 minutes) for only four times throughout the day with at least one hour between exposures. A "skin" notation refers to the potential significant contribution to the overall exposure by the cutaneous route, either by contact with vapors or, of probable greater significance, by direct skin contact with the substance. ACGIH-TLVs are only recommended guidelines based upon consensus agreement of the membership of the ACGIH. As such, the ACGIH TLVs are for guideline use purposes and are not legal regulatory standards for compliance purposes. The TLVs are designed for use by individuals trained in the discipline of industrial hygiene relative to the evaluation of exposure to various chemical or biological substances and physical agents that may be found in the workplace.
3. 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.
4. 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.
5. 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/m³ for total dust and 5.0 mg/m³ for the respirable fraction.
6. 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 2015 TLVs[®] and BEIs[®] Appendix D, paragraph C.
7. 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 2015 TLVs[®] and BEIs[®] (Biological Exposure Indices) Appendix D, paragraph A.

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 determines the extent of respiratory protection needed. Half-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 10 times the exposure limit. Full-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 50 times the exposure limit. Protection by air-purifying negative-pressure and powered air respirators is limited. Use a positive-pressure-demand, full-face, supplied air respirator or self-contained breathing apparatus (SCBA) for concentrations above 50 times the exposure limit. If exposure is above the IDLH (Immediately dangerous to life or health) for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-pressure 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(j) Upper/lower Flammability or Explosive Limits: NA
9(b) Odor: Odorless	9(k) Vapor Pressure: NA
9(c) Odor Threshold: NA	9(l) Vapor Density (Air = 1): NA
9(d) pH: NA	9(m) Relative Density: 7-8
9(e) Melting Point/Freezing Point: ~2750 °F (~1510 C) / NA	9(n) Solubility(ies): NA
9(f) Initial Boiling Point and Boiling Range: ND	9(o) Partition Coefficient n-octanol/water: ND
9(g) Flash Point: NA	9(p) Auto-ignition Temperature: NA
9(h) Evaporation Rate: NA	9(q) Decomposition Temperature: ND
9(i) Flammability (solid, gas): Non-flammable, non-combustible	9(r) Viscosity: NA

NA - Not Applicable
ND - Not Determined for product as a whole

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 **55% Aluminum-Zinc Carbon Steel Sheet** when further processed using the information available for its components applied to the guidance on the preparation of an SDS under the GHS requirements of OSHA and the EU CPL.

Hazard Classification	Hazard Category		Hazard Symbols	Signal Word	Hazard Statement
	EU	OSHA			
Acute Toxicity - Oral (covers Categories 1, 2, 3 and 4)	NR*	4 ^a		Warning	Harmful if swallowed.
Eye Damage/ Irritation (covers Categories 1, 2A and 2B)	NR*	2B ^c	No Pictogram	Warning	Causes eye irritation.

Hazard Classification	Hazard Category		Hazard Symbols	Signal Word	Hazard Statement
	EU	OSHA			
Skin/Dermal Sensitization (covers Category 1)	NR*	1 ^d		Warning	May cause an allergic skin reaction.
Carcinogenicity (covers Categories 1A, 1B and 2)	NR*	1B ^e		Danger	May cause cancer.
Toxic Reproduction (covers Categories 1A, 1B and 2)	NR*	2 ^h		Danger	May damage fertility or the unborn child.
Specific Target Organ Toxicity (STOT) Following Single Exposure (covers Categories 1-3)	NR*	3 ⁱ		Warning	May cause respiratory irritation.
STOT following Repeated Exposure (covers Categories 1 and 2)	NR*	1 ^j		Danger	Causes damage to lungs through prolonged or repeated inhalation exposure.

* Not Rated. Semi-formed steel products are considered articles under Reach regulation (REACH REGULATION (EC) No 1907/2006) and are not subject to classification under CLP regulation (REGULATION (EC) No 1272/2008).

Toxicological data listed below are presented regardless to classification criteria. Individual hazard classification categories where the toxicological information has met or exceeded a classification criteria threshold are listed above.

a. No LC₅₀ or LD₅₀ has been established for **55% Aluminum-Zinc Carbon Steel Sheet** as a mixture. The following data has been determined for the components:

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

b. No Skin (Dermal) Irritation data available for **55% Aluminum-Zinc Carbon Steel Sheet** as a mixture or its individual components.

c. No Eye Irritation data available for **55% Aluminum-Zinc Carbon Steel Sheet** as a mixture. The following Eye Irritation information was found for the components:

- **Iron:** 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 **55% Aluminum-Zinc Carbon Steel Sheet** 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 **55% Aluminum-Zinc Carbon Steel Sheet** as a mixture or its components.

f. No Germ Cell Mutagenicity data available for **55% Aluminum-Zinc Carbon Steel Sheet** 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 **55% Aluminum-Zinc Carbon Steel Sheet** as carcinogens. The following Carcinogenicity information was found for the components:

- **Welding Fumes** - IARC Group 2B carcinogen, a mixture that is possibly carcinogenic to humans.
- **Nickel and certain nickel compounds** – Group 2B - metallic nickel Group 1 - nickel compounds ACGIH confirmed human carcinogen. Nickel – EURAR Insufficient evidence to conclude carcinogenic potential in animals or humans; suspect carcinogen classification Category 2 Suspected of causing cancer.
- **Chromium (as metal and trivalent chromium compounds)** – IARC Group 3 carcinogens, not classifiable as to their human carcinogenicity.

h. No Toxic Reproduction data available for **55% Aluminum-Zinc Carbon Steel Sheet** as a mixture. The following Toxic Reproductive information was found for the components:

- **Nickel:** Effects on fertility.

i. No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **55% Aluminum-Zinc Carbon Steel Sheet** as a mixture. The following STOT following a Single Exposure data was found for the components:

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

11 Information on toxicological effects (continued):

j. No Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available for **55% Aluminum-Zinc Carbon Steel Sheet** as a mixture. The following STOT following Repeated Exposure data was found for the components:

- **Nickel:** Rat 4 wk inhalation LOEL 4 mg/m³ Lung and Lymph node histopathology. Rat 2 yr inhalation LOEL 0.1 mg/ m³ Pigment in kidney, effects on hematopoiesis spleen and bone marrow and adrenal tumor. Rat 13 Week Inhalation LOAEC 1.0 mg/m³ Lung weights, and Alveolar histopathology.
- **Manganese:** Inhalation of metal fumes - Degenerative changes in human Brain; Behavioral: Changes in motor activity and muscle weakness (Whitlock *et al.*, 1966).

The above toxicity information was determined from available scientific sources to illustrate the prevailing posture of the scientific community. The scientific resources includes: The American Conference of Governmental Industrial Hygienist (ACGIH) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure indices (BEIs) with Other Worldwide Occupational Exposure Values 2009, 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 have been associated with causing metal fume fever.
- **Eye:** Excessive exposure to high concentrations of metal dust may cause irritation to the eyes.
- **Skin:** Skin contact with metal dusts may cause irritation or sensitization, possibly leading to dermatitis. Skin contact with metallic fumes and dusts may cause physical abrasion.
- **Ingestion:** Ingestion of harmful amounts of this product as distributed is unlikely due to its solid insoluble form. Ingestion of metal dust may cause nausea or vomiting.

Acute Effects by component:

- **Iron and iron oxides:** Iron is harmful if swallowed, causes skin irritation, and causes eye irritation. Contact with iron oxide has been reported to cause skin irritation and serious eye damage. Particles of iron or iron compounds, which become imbedded in the eye, may cause rust stains unless removed fairly promptly.
- **Manganese and manganese oxides:** Manganese and Manganese oxide are harmful if swallowed.
- **Chromium and chromium oxides:** Hexavalent chrome causes damage to gastrointestinal tract, lung, severe skin burns and eye damage, serious eye damage, skin contact may cause an allergic skin reaction. Inhalation may cause allergic or asthmatic symptoms or breathing difficulties.
- **Nickel and nickel oxides:** Nickel may cause allergic skin sensitization. Nickel oxide may cause an allergic skin.
- **Silicon and silicon oxides:** May be harmful if swallowed.
- **Aluminum and aluminum oxides:** Inhalation may cause cough.
- **Vanadium and vanadium pentoxide:** Vanadium oxide is fatal if swallowed or inhaled, and may be harmful in contact with skin
- **Zinc and zinc oxides:** Not Reported/ Not Classified

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. Iron oxide is listed as a Group 3 (not classifiable) carcinogen by the International Agency for Research on Cancer (IARC).
- **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.
- **Chromium and chromium oxides:** 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. NTP (The National Toxicology Program) Fourth Annual report on Carcinogens cites “certain Chromium compounds” as human carcinogens. ACGIH has reviewed the toxicity data and concluded that chromium metal is not classifiable as a human carcinogen. 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.

Delayed (chronic) Effects by component (continued):

- **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. IARC lists nickel and certain nickel compounds as Group 2B carcinogens (sufficient animal data). ACGIH 2015 TLVs® and BEIs® lists insoluble nickel compounds as confirmed human carcinogens. Nickel is suspected of damaging the unborn child.
- **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.
- **Aluminum and aluminum oxides:** Considered to be an inert or nuisance dust.

- **Vanadium and vanadium pentoxide:** Vanadium is considered non-toxic. Excessive long term or repeated exposures to vanadium compounds, especially vanadium pentoxide, may result in chronic pulmonary changes such as emphysema or bronchitis. Vanadium pentoxide is suspected of damaging fertility or the unborn child. Vanadium pentoxide is fatal if swallowed or inhaled. It causes damage to lungs by single, repeated or prolonged exposure.
- **Zinc and zinc oxides:** Zinc is a low health risk by inhalation and should be treated as a nuisance dust. Inhalation of zinc oxide fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.

Section 12 - Ecological Information

12(a) Ecotoxicity (aquatic & terrestrial): No Data Available for **55% Aluminum-Zinc Carbon Steel Sheet** as sold/shipped. However, individual components of the product when processed have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife as follows:

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

12(b) Persistence & Degradability: No Data Available for **55% Aluminum-Zinc Carbon Steel Sheet** as sold/shipped or individual components.

12(c) Bioaccumulative Potential: No Data Available for **55% Aluminum-Zinc Carbon Steel Sheet** as sold/shipped or individual components.

12(d) Mobility (in soil): No data available for **55% Aluminum-Zinc Carbon Steel Sheet** 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 55% Aluminum-Zinc Carbon Steel Sheet 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 **55% Aluminum-Zinc Carbon Steel Sheet** 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) Shipping Symbols: NA Hazard Class: NA UN No.: NA Packing Group: NA DOT/IMO Label: NA Special Provisions (172.102): NA	Packaging Authorizations a) Exceptions: NA b) Group: NA c) Authorization: NA	Quantity Limitations a) Passenger, Aircraft, or Railcar: NA b) Cargo Aircraft Only: NA Vessel Stowage Requirements a) Vessel Stowage: NA b) Other: NA DOT Reportable Quantities: NA
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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 **55% Aluminum-Zinc Carbon Steel Sheet** as a hazardous material.

Shipping Name: Not Applicable (NA) Classification Code: NA UN No.: NA Packing Group: NA ADR Label: NA Special Provisions: NA Limited Quantities: NA	Packaging a) Packing Instructions: NA b) Special Packing Provisions: NA c) Mixed Packing Provisions: NA	Portable Tanks & Bulk Containers a) Instructions: NA b) Special Provisions: NA
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International Air Transport Association (IATA) does not regulate **55% Aluminum-Zinc Carbon Steel Sheet** as a hazardous material.

Shipping Name: Not Applicable (NA) Class/Division: NA Hazard Label (s): NA UN No.: NA Packing Group: NA Excepted Quantities (EQ): NA	Passenger & Cargo Aircraft Limited Quantity (EQ)		Cargo Aircraft Only Pkg Inst: NA	Special Provisions: NA ERG Code: NA
	Pkg Inst: NA	Pkg Inst: NA	Max Net Qty/Pkg: NA	
	Max Net Qty/Pkg: NA	Max Net Qty/Pkg: NA	Max Net Qty/Pkg: NA	

Pkg Inst – Packing Instructions

Max Net Qty/Pkg – Maximum Net Quantity per Package

ERG – Emergency Response Drill Code

Transport Dangerous Goods (TDG) Classification: 55% Aluminum-Zinc Carbon Steel Sheet does not have a TDG classification.

Section 15 - Regulatory Information

Regulatory Information: The following listing of regulations relating to a Steel Dynamics 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, **55% Aluminum-Zinc Carbon Steel Sheet** 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, **55% Aluminum-Zinc Carbon Steel Sheet** is not listed as a mixture. However, individual components of the product are listed:

Components	Regulations
Manganese	SARA 313
Chromium	CERCLA, CWA, SARA 313
Nickel	CERCLA, CWA, SARA 313, TSCA
Vanadium	TSCA
Zinc compounds	CWA, SARA 313

SARA Potential Hazard Categories: Immediate Acute Health Hazard; Delayed Chronic Health Hazard

Section 313 Supplier Notification: The product, **55% Aluminum-Zinc Carbon Steel Sheet** contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-to-Know Act and 40 CFR part 372:

CAS #	Chemical Name	Percent by Weight
7439-96-5	Manganese	2.0 max
7440-47-3	Chromium	1.0 max
7440-02-0	Nickel	0.4 max
7440-66-6	Zinc	<0.1 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, **55% Aluminum-Zinc Carbon Steel Sheet** as a mixture 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, Nickel, Aluminum, Silicon, Vanadium, Zinc
- Environmental Hazards: Chromium, Manganese, and Nickel, Aluminum, Vanadium, Zinc
- Special Hazardous Substance: Chromium, Nickel

State Regulations (continued):

California Prop 65  **WARNING:** This product can expose you to nickel and hexavalent chromium, which are known to the State of California to cause cancer, and hexavalent chromium, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov. Some available surface treatments for this product do not contain all of the chemicals identified above – please contact the facility for information about alternative surface treatments to avoid or reduce any exposure to the identified chemicals.

New Jersey: Contains regulated material in the following categories:

- Hazardous Substance: Chromium, Manganese, Nickel, Silicon, Aluminum (dust or fume), Vanadium, Zinc
- Environmental Hazards: Chromium, Manganese, Nickel, Vanadium, Zinc
- Special Hazardous Substance: Chromium, Manganese, Silicon, Aluminum (dust or fume)

Minnesota: Chromium, Manganese, Nickel, Zinc

Massachusetts: Chromium, Manganese (compounds), Nickel (compounds), Silicon, Aluminum (dust or fume), Vanadium, Zinc

Other Regulations:

WHMIS Classification (Canadian): The product, 55% Aluminum-Zinc Carbon Steel Sheet is not listed as a mixture. However individual components are listed.

Ingredients	WHMIS Classification
Manganese	Reproductive toxicity - Category 2; Specific target organ toxicity - repeated exposure - Category 1; Combustible dusts
Chromium	Combustible dusts
Silicon	Flammable solids - Category 2; Combustible dusts
Nickel	Skin sensitization – Category 1; Carcinogenicity – Category 2; Specific target organ toxicity – repeated exposure - Category 1

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: Steel Dynamics Inc (SDI)

Original Issue Date:

8/26/2002 (original)
1/13/2015 (revision GHS)
8/31/2018 (updated to comply with California Prop 65)

Expiration Date: 04/07/2020

04/07/2017 (update to comply w/ OSHA 2012 GHS & Canada WHMIS 2015 GHS)

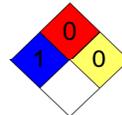
Additional Information:

Hazardous Material Identification System (HMIS) Classification

Health Hazard	1
Fire Hazard	0
Physical Hazard	0

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.

National Fire Protection Association (NFPA)



HEALTH = 1, Exposure could cause irritation but only minor residual injury even if no treatment is given.
FLAMMABILITY = 0, Materials that will not burn.
INSTABILITY = 0, Normally stable, even under fire exposure conditions, and are not reactive with water.

ABBREVIATIONS/ACRONYMS:

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

Disclaimer: The information in this SDS was obtained from sources believed to be reliable, however, the information is provided without any representation or warranty, expressed or implied, regarding the accuracy or correctness.