

MATERIAL SAFETY DATA SHEET

1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: CARBON STEEL/HIGH STRENGTH LOW ALLOY (HSLA) PLATE

DESCRIPTION: Silver-Gray Steel Plate, various uses

MANUFACTURER:

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2 - COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	CAS NUMBER	PERCENTAGE BY WEIGHT	OSHA PEL	ACGIH TLV
Iron	7439-89-6	96 – 99	10 mg/m ³ , Fe ₂ O ₃ Form, Fume	5 mg/m ³ , Dust and Fume, as Fe
Manganese	7439-96-5	0.3 - 1.65	5 mg/m ³ Ceiling, Compounds and Fume, as Mn	0.2 mg/m ³ , Compounds and Fume, as Mn
Contains less than 1% of each of the following: Chromium, Copper, Nickel, Silicon, Molybdenum, Carbon, Tin, Vanadium, Lead. See Sec. 15				

NOTES: 1) All exposure limits are 8-hour TWAs unless otherwise specified. 2) Commercial metal alloys may contain small amounts of various elements in addition to those specified. These small quantities frequently referred to as "trace" or "residual" elements, generally originate in the raw material used. These elements may include, but are not limited to the following: Sulfur, Phosphorous, Aluminum, Arsenic, Boron, Cadmium, Cobalt, Lead, Niobium, Titanium, Calcium, and Zirconium. 3) Abbreviations / acronyms are defined in Section 16.

3 - HAZARDS IDENTIFICATION

GENERAL HAZARD STATEMENT: Solid metallic products distributed by EVRAZ Claymont Steel are generally classified as "articles" and do not constitute a hazardous material in solid form under the terms of the OSHA Hazard Communication Standard. Any articles manufactured from these solid products would be generally classified as non-hazardous. However, metallic elements contained in these products can be emitted as airborne contaminants under certain processing conditions such as burning, melting, cutting, sawing, brazing, grinding, milling, machining.

Certain materials and equipment utilized in processing of steel products (cutting/machining fluids, coatings, processing lubricants, cleaning/pickling chemicals, welding fluxes, torch and plasma cutting systems) may constitute a health hazard. Processing hazards should be assessed by an Industrial Hygienist or other competent person, and treated accordingly.

EMERGENCY OVERVIEW: Odorless solid metal plate, silver-gray color. This bulk solid steel product poses little or no immediate health or fire hazards. When steel is subjected to welding, burning, melting, sawing, brazing, grinding, or other similar processes, potentially hazardous airborne particulate may be generated. These operations should be performed in well-ventilated areas under the direction of a competent health and safety professional. If appropriate, respiratory protection and other PPE should be utilized.

HMIS DESIGNATION: HEALTH 1 FLAMMABILITY 0 REACTIVITY 0
NFPA RATING: HEALTH 1 FLAMMABILITY 0 REACTIVITY 0

The above designations apply to solid material. Exposure risk is dependent upon particle size. Health hazard is primarily associated with manganese content.

PRIMARY ROUTE OF ENTRY: Inhalation of dust or fume during welding, burning, melting, cutting, brazing, grinding, machining and other operations.

NOTE: The composition of fumes from welding are not only dependent on the metal being welded, but also on the process and electrodes used. A full health hazard assessment should be performed by a competent health and safety professional for all welding and other operations performed on this alloy.

ACUTE EFFECTS OF OVEREXPOSURE:

INHALATION:

Exposures to high concentrations of airborne fumes or dusts may result in irritation and/or sensitization of the lungs and other mucous membranes.

Excessive inhalation of airborne fumes from some metals can produce an acute influenza-like reaction known as "metal fume fever".

EYE:

Exposure to high concentrations of fumes or dusts may cause eye irritation.

SKIN:

Exposure to dust may cause irritation or sensitization, possibly leading to dermatitis.

INGESTION:

Ingestion of harmful amounts of carbon steel plate is unlikely due to its solid, insoluble form. Ingestion of dust may cause nausea and/or vomiting. Other serious effects may occur if large amounts of dust are swallowed.

CHRONIC EFFECTS OF OVEREXPOSURE:

EXCESSIVE AND REPEATED EXPOSURES TO HIGH CONCENTRATIONS OF AIRBORNE FUME OR DUST MAY CAUSE:

Allergic sensitization - dermatitis and asthma

Lung inflammation and damage - pneumonitis, pneumonia, bronchitis, siderosis (benign lung disease caused by inhaling iron particles)

Eye inflammation

Central nervous system damage, possibly permanent

Kidney disorders.

CARCINOGENICITY:

The carcinogenicity of this steel as a whole has not been tested.

Some trace constituents may be associated with carcinogenicity.

No component greater than 0.1% by weight within this alloy is regulated by OSHA within 29 CFR 1910 Subpart Z as a carcinogen.

SIGNS AND SYMPTOMS OF OVEREXPOSURE TO AIRBORNE FUME OR DUST:

- Redness, swelling, itching, and/or irritation of skin and eyes
- Respiratory difficulties - coughing, wheezing, shortness of breath, dyspnea, decreased pulmonary function
- Metal fume fever - symptoms consist of chills and fever (very similar and easily confused with flu symptoms), a metallic taste in the mouth, dryness, and irritation of the throat. The symptoms occur 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 in the literature.
- Kidney disorders, lower back pain, fluid retention.
- Central nervous system effects; languor, sleepiness, weakness, emotional disturbances, spastic gait, paralysis.

NOTE: For specific toxicological and other chronic effects information concerning the individual components of this steel product see SECTION 11.0, *TOXICOLOGICAL INFORMATION*.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Pre-existing health conditions, allergies and respiratory disorders may be exacerbated by airborne dust. Inhalation of high concentrations of Iron Oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

4 - FIRST AID MEASURES

INHALATION: If overexposure occurs, immediately remove victim from the adverse environment to fresh air and seek medical attention. If breathing has stopped, certified individuals should perform CPR. If breathing is difficult, administer oxygen. Keep affected person warm and at rest.

EYE: Immediately flush with large amounts of running water for several minutes. Seek prompt medical attention.

SKIN: If dust gets on skin, wash contaminated area with soap and water. Remove and wash contaminated clothing. If rash or irritation persists, seek medical attention.

INGESTION: Get medical attention immediately.

5 - FIRE FIGHTING MEASURES

FLASH POINT: Non-Flammable

FLAMMABLE LIMITS: Non-Flammable

AUTOIGNITION TEMPERATURE: Non-Flammable

GENERAL FIRE HAZARD: None for carbon steel plate

FLAMMABILITY CLASSIFICATION: Non-Flammable

EXTINGUISHING METHOD: For carbon steel plate, as appropriate for surrounding fire. A fire involving finely divided steel should be treated as a Class D combustible metal fire. Fire should be extinguished by a properly trained and experienced firefighter. Proper care should be taken in applying extinguishing agent and in allowing to burn itself out.

FIRE FIGHTING EQUIPMENT: For carbon steel plate, as appropriate for surrounding fire. Positive pressure SCBA and structural firefighter's protective clothing should be used at a minimum for surrounding fire.

UNUSUAL FIRE OR EXPLOSION HAZARDS: Carbon steel plate does not constitute a fire or explosion hazard. Finely divided, suspended particulates may present a fire and explosion hazard in the presence of an ignition source.

Finely divided alloy (e.g. dust, shavings, etc.) may be combustible. May be ignited by heat, sparks, or flames. May burn rapidly with flare-burning effect. Fire may produce irritating or poisonous gases. High concentrations of airborne dust in an enclosed area can explode or burn if exposed to a source of ignition. Care should be taken to avoid the generation of airborne dust. Use of water on finely divided alloy may cause explosive hydrogen gas and heat to be evolved. Oxygen deficiency may result from burning finely divided metal powder in poorly ventilated or confined areas.

HAZARDOUS COMBUSTION PRODUCTS: N/A for carbon steel plate. Toxic metal and metallic oxide fumes may be evolved from fires involving finely divided steel.

6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED: No problems with spills of this product would occur because of its bulk solid form. If there is a spill of dust, the following precautions should be taken:

Shut off ignition sources; no flares, smoking or flames should be in or near hazard area.

Clean up using methods which avoid dust generation.

Compressed air should not be used to clean up spills.

During cleanup, skin and eye contact and inhalation of dust should be avoided as much as possible.

Provide local exhaust or dilution ventilation as required.

Appropriate PPE should be worn during cleanup if exposure limits are exceeded (see SECTION 8, *EXPOSURE CONTROLS/PERSONAL PROTECTION*).

Collect material in compatible and appropriately labeled containers.

For small dry spills, place material into clean dry container with a clean shovel, and cover loosely; move container from spill area.

Comply with federal, state, and local regulations regarding reporting of spills and waste disposal.

7 - HANDLING AND STORAGE

HANDLING: Avoid breathing of and contact with fumes and dusts during processing. No specific requirements for bulk solid steel product.

STORAGE: Keep away from incompatible materials (see SECTION 10, *STABILITY AND REACTIVITY*). No other specific storage procedures are required for bulk solid steel product.

8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Local and/or general exhaust ventilation should be used to keep worker exposure below applicable exposure limits (see SECTION 2, *COMPOSITION/INFORMATION ON INGREDIENTS, for PELs and TLVs*) during welding, brazing, grinding, machining, and other processes which may generate airborne contaminants.

RESPIRATORY: When engineering or administrative controls can not keep exposures below exposure limits during welding, brazing, machining, and other processes which may generate airborne contaminants or while being instituted, use an appropriate NIOSH/MSHA approved respirator. If respiratory protection is required, all appropriate requirements as set forth in 29 CFR 1910.134 must be met. A competent health and safety professional should be consulted for respirator selection, fit testing, and training. Use a NIOSH-approved positive-pressure, air-supplied respirator if exposure levels are unknown, or any other circumstance where an air-purifying respirator would not be adequate.

GLOVES: Suitable for protection against physical injury and skin contact during handling and processing.

EYE: Safety glasses or goggles when there is a reasonable probability of contact with dust or fume.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Safety shoes and clothing that protects skin from prolonged or repeated contact. Change clothing if there is a reasonable probability of contamination.

9 - PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: Fe: 3,000°C (5,432°F)

Vapor Pressure (mm Hg, @ 72 °F): Negligible

Vapor Density (AIR = 1): Does not vaporize at ambient conditions

Melting Point: Fe: 1,536°C (2,797°F)

Appearance and Odor: Silver-gray metallic plate, odorless

Specific Gravity (H₂O = 1): 7 to 8

Evaporation Rate: Does not vaporize at ambient conditions

Solubility in water: Insoluble

pH: N/A

10 - STABILITY AND REACTIVITY

STABILITY: Stable under normal conditions of use, storage and transport.

CONDITIONS TO AVOID: Contact with incompatible materials. Avoid creating finely divided, concentrated airborne particulates in the presence of ignition sources.

INCOMPATIBLE MATERIALS: Oxidizers. Fine particles can react with strong acids to form explosive hydrogen gas and heat.

HAZARDOUS DECOMPOSITION PRODUCTS: Extreme heat from fire or processing (e.g. welding, brazing, machining, etc.) may produce toxic or irritating airborne particulate, including metal and metallic oxide fumes. Reaction of some metals (e.g. iron, manganese), with water, steam, acids, etc. will evolve hydrogen, which is a highly dangerous fire and explosion hazard.

HAZARDOUS POLYMERIZATION: Will not occur

11 - TOXICOLOGICAL INFORMATION

Iron Oxide (Fe₂O₃)

Iron is a necessary human nutrient and must be viewed as a substance of low-level toxicity by ingestion. Iron dust 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. No physical impairment of lung function has been associated with siderosis. Inhalation of excessive concentrations of iron oxide has been reported to enhance the risk of lung cancer development in individuals exposed to pulmonary carcinogens.

Carcinogenicity:

Animal studies have implicated iron as an animal carcinogen, however, regulatory agencies have elected not to designate iron/iron oxide as a suspected human carcinogen.

Manganese (Mn)

Chronic manganese poisoning may result from prolonged inhalation of excessive manganese dust and fumes. The central nervous system is the chief site of damage. Symptoms include languor, sleepiness, weakness, mask-like appearance of face, emotional disturbances, spastic gait, recurring leg cramps, kidney damage, and paralysis. Excess incidence of pneumonia and other upper respiratory infections has been reported in workers exposed repeatedly to high airborne concentrations of dust or fume of manganese compounds. Manganese compounds are experimental equivocal tumorigenic agents.

Carcinogenicity:

Manganese is not listed by IARC, NTP, OSHA, NIOSH, or ACGIH as a known or suspected human carcinogen

12 - ECOLOGICAL INFORMATION

Solid steel products present minimal ecological risk. Finely divided particles can become airborne or waterborne. Metals can react with water and oxygen in the outdoor environment to form oxides, hydroxides and other hydrated species. Metals can react with acidic constituents in the environment to form corresponding salts. Components are inorganic and not biodegradable. Metallic components and other elemental constituents will prevail in the environment indefinitely.

13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Solid product is not known to be hazardous, however, each individual case should be evaluated. Finely divided forms may be classified as hazardous waste as defined within 40 CFR 261, and possibly more restricting state and/or local regulations may apply. All solid wastes generated from manufacturing processes should be classified by a competent environmental professional and disposed, processed, or recycled in accordance with federal, state and local regulations.

14 - TRANSPORT INFORMATION

HAZARDOUS MATERIALS DESCRIPTION/PROPER SHIPPING NAME: N/A for bulk solid steel.

HAZARD CLASS: N/A for bulk solid steel.

IDENTIFICATION NO.: N/A for bulk solid steel.

DOT: Solid product is not defined as a hazardous material.

15 - REGULATORY INFORMATION

SARA TITLE III HAZARD CATEGORIZATION: Product (dust and fume) is categorized as an immediate (acute) health hazard and a delayed (chronic) health hazard as defined by 40 CFR 370.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (EHSs): No components are listed as extremely hazardous substances.

SARA TITLE III SECTION 313 REPORTABLE SUBSTANCES:

The following chemicals are subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372).

CAS #	Chemical Name	Wgt %
7440-02-0	Nickel	0.50 % max
7439-96-5	Manganese	1.65 % max
7439-92-1	Lead	0.05% max

CERCLA HAZARDOUS SUBSTANCES: CERCLA metals (arsenic, cadmium, lead, nickel, chromium, and copper) may be reportable if particle size is less than 100 microns.

OSHA HAZARD COMMUNICATION: Employees must be informed of potential dust hazards if they are assigned duties such as welding, cutting, grinding or other metal processing that can generate airborne dust.

16 - OTHER INFORMATION

ABBREVIATIONS/ACRONYMS:

Following are some abbreviations and acronyms that appear in MSDSs.

ACGIH	American Conference of Governmental Industrial Hygienists	MSHA	Mine Safety and Health Administration
ANSI	American National Standards Institute	NFPA	National Fire Protection Association
C	Ceiling Exposure Limit	NIF	No Information Found
CAS	Chemical Abstracts Service	NIOSH	National Institute for Occupational Safety and Health
CERCLA	Comprehensive Environmental Response, Compensation & Liability Act	NTP	National Toxicology Program
CFR	Code of Federal Regulations	OSHA	Occupational Safety and Health Administration
CPR	Cardiopulmonary Resuscitation	PEL	Permissible Exposure Limit
DOT	Department of Transportation	PNOR	Particulate Not Otherwise Regulated
EHS	Extremely Hazardous Substance	POTW	Publicly Owned Treatment Works
HMIS	Hazardous Materials Identification System	PPE	Personal Protective Equipment
IARC	International Agency for Research on Cancer	RCRA	Resource Conservation and Recovery Act
LD-50	Lethal Dose 50. The dose, usually administered orally or by gavage, that is lethal to 50% of experimental test animals.	SARA	Superfund Amendments and Reauthorization Act
mg/m ³	milligrams per cubic meter of air	SCBA	Self-contained Breathing Apparatus
mg/kg	milligrams per kilogram	STEL	Short-Term Exposure Limit
mppcf	million particles per cubic foot	TLV	Threshold Limit Value
MSDS	Material Safety Data Sheet	TWA	Time-weighted Average

DISCLAIMER:

Details presented in this MSDS were derived from literature sources and regulatory documents believed to be accurate and authoritative. The MSDS represents a non-exhaustive overview of the subject material. The purpose of this MSDS is to serve as a general guide to users of this product. It is the user's responsibility to comply with all federal, state and local

regulations. The user must satisfy requirements of applicable occupational health and environmental regulations. This MSDS is not intended as a total regulatory compliance document, nor should it be construed as a license or a recommendation to violate any law or infringe on any patent.

MFR. CONTACT: David Wagner (302-792-5444)	REVISION NO. 7	APPROVAL DATE: July 29, 2009
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