SDS Sheets for TrusSteel Products

Purpose of this Bulletin

The purpose of this Bulletin is to provide TrusSteel fabricators with Safety Data Sheets for the cold-formed steel sheet products from which the TrusSteel products are manufactured.

Application

Each TrusSteel fabricator shall keep these documents in their office and shop, and post and distribute them as instructed per local, state, and federal regulations.

Included Documents

- TrusSteel SDS sheet

Glossary of SDS Terms

ACUTE: An adverse effect on the human body with symptoms of high severity coming quickly to a crisis.

ASPHYXIANT: A gas or vapor which can take up space in the air and reduce the concentration of oxygen available in the body. Examples include acetylene, methane, and carbon dioxide. Asphyxiants are of special concern in confined spaces.

BOILING POINT: Temperature at which a liquid changes to a vapor state at a given pressure (usually sea level pressure = 760 mmHg). Mixtures may have a boiling range. Flammable materials with low boiling points usually present special fire hazards.

"C" OR CEILING: The maximum allowable human exposure limit for an airborne substance; not to be exceeded even momentarily. Examples: hydrogen chloride, chlorine, nitrogen dioxide, and some isocyanates have ceiling standards.

CARCINOGEN: A substance that causes cancer.

CC: Cubic centimeter; a volume measurement in the metric system, equal in capacity to one milliliter (ml).

CEILING LIMIT: The maximum amount of a toxic substance allowed to be in workroom air at any time during the day.

CHRONIC EFFECT: An adverse effect on a human or animal body with symptoms which develop slowly or over a long period of time or which recur frequently. The harmful effects resulting from asbestos and silica are considered "chronic effects."

CHRONIC TOXICITY: Adverse (chronic) effects resulting from repeated doses of or exposures to a substance over a relatively prolonged period of time. Ordinarily used to denote effects in experimental animals.

COMBUSTIBLE LIQUID: Any liquid having a flash point at or above 100F (37.8C), but below 200F (93.3C), except any mixture having components with flash points of 200F (93.3C) or higher, the total volume of which make up 99 per cent or more of the total volume of the mixture.

COMMON NAME: Any designation or identification such as code name, code number, trade name, brand name, or generic name used to identify a chemical other than by its chemical name.

CORROSIVE: A liquid or solid that causes visible destruction in skin tissue at the site on contact.

CUTANEOUS HAZARDS: Chemicals which affect the dermal (skin) layer of the body. Signs and symptoms are defatting of the skin, rashes, irritation.

DECOMPOSITION: Breakdown of a material or substance (by heat, chemical reaction, electrolysis, decay, or other processes) into simpler compounds.

DECOMPOSITION PRODUCTS: Describes the hazardous materials produced during heated operations.

DENSITY: The mass of a substance per unit volume. The density of a substance is usually compared to water, which has a density of 1. Substances which float on water have densities less than 1; substances which sink have densities greater than 1.

DERMAL: Used on or applied to the skin.

DERMAL TOXICITY: Adverse effects resulting from skin exposure to a substance. Ordinarily said to denote effects in experimental animals.

DERMATITIS: Inflammation of the skin.

EHS: Environmental Health and Safety office.

EVAPORATION RATE: The rate at which a product will vaporize when compared to the rate of vaporization of a known material (usually Butyl Acetate with rate designated as 1.0). Evaporation rate can be useful in evaluation of health and fire hazards of a material. Rates are classified as fast (greater than 3.0), medium (0.8 to 3.0), and slow (less than 0.9). Evaporation rate of water is 0.3.

EXPLOSIVE: A chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

EXPLOSIVE LIMITS: The lowest concentration of a combustible or flammable gas or vapor in air that will produce a flash of fire. Mixtures below this concentration are too "lean" to burn.

EXPOSURE: A person's contact with a hazardous chemical in the course of employment through any route of entry (inhalation, ingestion, skin contact or absorption, etc.).

EXTINGUISHING MEDIA: Specifies the fire-fighting agents that should be used to extinguish fires.

FLAMMABLE: Flammable limits describe the range of concentrations of a flammable gas or vapor in air that will produce a flash of fire in the presence of an ignition source. A "flammable liquid" is a solution with a flash point below 100F (37.8C).

FLASH POINT: The temperature at which a liquid will give off enough flammable vapor to ignite. The lower the flash point, the more dangerous the product. A "flammable liquid" is a solution with a flash point below 100F (37.8C). Flash point values are most important when dealing with hydrocarbon solvents. The flash point of a material may vary depending on the method used, so the test method is indicated when the flash point is given.

FORESEEABLE EMERGENCY: Any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which could result in an uncontrolled release of hazardous chemical into the workplace.

HAZARDOUS MATERIAL: In a broad sense, any substance or mixture of substances having properties capable of producing adverse effects on the health or safety or a human being.

HAZARD RATINGS: Material ratings of one to four which indicate the severity of hazard with respect to health, flammability, and reactivity.

HAZARD WARNING: Any words, picture, symbols, or combination thereof appearing on a label or other appropriate form of warning which conveys the hazards of the chemical(s) in the container(s).

HEALTH HAZARD: A chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles, that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes.

HEPATOTOXINS: Chemicals that produce liver damage.

HVAC: Heating, ventilation and air conditioning.

IGNITABLE: Capable of being set on fire.

INCOMPATIBLE: Materials that could cause dangerous reactions from direct contact with one another. These types of chemicals should never be stored together.

INGESTION: The taking in of a substance through the mouth.

INHALATION: The breathing in of a substance in the form of a gas, vapor, fume, mist, or dust.

IRRITANT: A substance that by contact in sufficient concentration for a sufficient period of time, will cause an inflammatory response or reaction of the eye, skin, or respiratory system. The contact may be a single exposure or multiple exposures.

LC: Lethal Concentration; a concentration of a substance being tested that will kill a test animal.

LETHAL CONCENTRATION 50 (LC50): The concentration of a material in air which on the basis of laboratory tests is expected to kill 50 per cent of a group of test animals when administered as a single exposure (usually 1 to 4 hours).

LD: Lethal Dose; a concentration of a substance being tested that will kill a test animal.

LETHAL DOSE 50 (LD50): A single dose of chemical which on the basis of laboratory tests is expected to kill 50 per cent of a group of test animals. The LD50 dose is usually expressed as milligrams or grams of chemical per kilogram of animal body weight (mg/kg or g/kg).

MELTING POINT: The temperature at which a solid substance changes to a liquid state. For mixtures, the melting range may be given.

MIXTURE: Any combination or two or more chemicals if the combination is not in whole or in part the result of a chemical reaction.

MUTAGEN: Any substance able to induce mutations in DNA and living cells.

NARCOSIS: Stupor or unconsciousness produced by a chemical.

NEPHROTOXINS: Chemicals that produce kidney damage.

NEUROTOXINS: Chemicals that produce their primary toxic effects on the nervous system.

OCCUPATIONAL EXPOSURE LIMITS: Maximum allowable concentrations of toxic substances in workroom air to protect workers who are exposed to toxic substances over a working lifetime.

ORAL TOXICITY: Adverse effects resulting from taking a substance into the body via the mouth. Ordinarily used to denote effects in experimental animals.

OXIDIZER: A chemical other than a blasting agent or explosive that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

PERMISSIBLE EXPOSURE LIMITS (PEL's): PEL's are OSHA's legal exposure limits.

pH: A number that describes the acidity of alkalinity or an aqueous solution.

PHYSICAL HAZARD: A chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

POLYMERIZATION: A chemical reaction in which one or more small molecules combine to form larger molecules at a rate which releases large amounts of energy. If hazardous polymerization can occur with a given material, the SDS usually will list conditions which could start the reaction; and since the material in most cases contains a polymerization inhibitor, it is usually used up, and no longer capable of preventing a reaction.

PPM (Parts Per Million): Parts of vapor or gas per million parts of contaminated air by volume.

PPB (Parts Per Billion): Parts of vapor or gas per billion parts of contaminated air by volume.

PPE: Personal Protective Equipment.

REACTIVITY: A description of the tendency of a substance to undergo chemical reaction with the release of energy. Undesirable effects such as pressure build-up, temperature increase, formation of noxious, toxic or corrosive byproducts may occur because of the reactivity of a substance by heating, burning, direct contact with other materials, or other conditions in use or in storage.

SENSITIZER: A substance which on first exposure causes little or no reaction but which on repeated exposure may cause a marked response not necessarily limited to the contact site. Skin sensitization is the most common form of sensitization in the industrial setting, although respiratory sensitization to a few chemicals is also known to occur.

SHIPPING INFORMATION: The appropriate name(s), hazard class(es), and identification number(s) as determined by the United States Department of Transportation, International Regulations, and the International Civil Aviation Organization.

SOLUBILITY: The extent to which a substance mixes with a liquid to produce a solution.

SOLVENT: Usually a liquid in which other substances are dissolved. The most common solvent is water.

SPECIFIC GRAVITY: The ratio of the weight of a given volume of any substance to the weight of an equal volume of water.

STABILITY: An expression of the ability of a material to remain unchanged under expected and reasonable conditions of storage and use.

TERATOGEN: Any substance that causes growth abnormalities in embryos, genetic modifications in cells, etc.

THRESHOLD LIMIT VALUES (TLV's): Expresses the airborne concentration of a material to which nearly all persons can be exposed day after day without adverse effects. TLV's are expressed three ways:

1. TLV-TWA: The allowable Time Weighted Average concentration for a normal 8-hour workday (40-hour work week).

2. TLV-STEL: The short-term exposure limit or maximum concentration for a continuous 15-minute exposure period (maximum of four such periods per day, with at least 60 minutes between exposure periods) and provided the TLV-TWA is not exceeded.

3. TLV-C: The ceiling exposure limit is the concentration that should never be exceeded, even instantaneously.

TOXICITY: The sum of adverse effects resulting from exposure to a material, generally by the mouth, skin, or respiratory tract.

TWA (Time Weighted Average exposure): The airborne concentration of a material to which a person is exposed, averaged the total exposure time; generally the total workday (8 to 12 hours).

VAPOR DENSITY: The density of a material's vapor, compared to the density of the air. If a vapor density is greater than one, it is denser than air and it will drop to the floor or the lowest point available. If the density is less than one, it is lighter than air and will float upwards like helium.

VAPOR PRESSURE: The pressure exerted at a given temperature of a vapor in equilibrium with its liquid or solid. The higher the vapor pressure, the more easily a liquid will evaporate. Liquid materials that evaporate easily are termed volatile, and this means that air concentrations can build up quickly when working with the material in liquid form. Materials with high vapor pressures may be particularly hazardous if you are working in enclosed or confined areas, or if the air circulation is poor. Note: Materials with lower vapor pressure still may pose an inhalation hazard.

WATER REACTIVE: A chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

Revisions

- This bulletin was revised on 1/10/02
- This bulletin was revised on 10/26/10
- This bulletin was revised on 03/04/13
- This bulletin was revised on 01/30/17

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Trade Name: Sheet Steel
CAS Number: Not applicable
Synonyms: Hot Band, Cold Rolled, P&O, Galvanized
Use/Description: Steel for thin gauge products and sheet steel for Castrip®

Company Identification:	**24 Hour Contact – CHEMTREC 1-800-424-9300**
Nucor Steel – Arkansas 7301 E. County Road 142 Blytheville, AR 72315	Safety Officer [8:00 am – 5:00 pm]: 1-(870) 762-2100
Nucor Steel – Berkeley 1455 Hagan Avenue Huger, SC 29450	Safety Officer [8:00 am – 5:00 pm]: 1-(843) 336-6000
Nucor Steel Decatur, LLC 4301 Iverson Boulevard Trinity, AL 35673	Safety Officer [8:00 am – 5:00 pm]: 1-(256) 301-3500
Nucor Steel – Indiana Castrip 4537 South Nucor Road Crawfordsville, IN 47933	Safety Officer [8:00 am – 5:00 pm]: 1-(765) 364-1323
Nucor Steel Gallatin 4831 U.S. Hwy 42 West Ghent, KY 41045	Safety Officer [8:00 am – 5:00 pm]: 1-(859) 567-3100

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

STEEL PRODUCTS AS SOLD BY NUCOR ARE NOT HAZARDOUS PER OSHA GHS 29 CFR 1910, 1915, 1926. However, individual customer processes, (such as welding, sawing, brazing, grinding, abrasive blasting, and machining) may result in the formation of fumes, dust (combustible or otherwise), and/or particulate that may present the following hazards:

OSHA Hazards:
Carcinogen
Skin Sensitizer
Target Organ Effect – Lungs

GHS Classification:
Carcinogenicity (Category 2)
Skin Sensitization (Category 1)
Specific Target Organ Toxicity-Repeated Exposure (Category 1)

Pictogram(s):

Signal Word: Danger

Hazard Statement(s)
H317: Dust/fumes may cause an allergic skin reaction.
H351: Dust/fumes suspected of causing cancer via inhalation.
H372: Inhalation of dust/fumes causes damage to respiratory tract through prolonged or repeated exposure

Precautionary Statement(s)
P202: Do not handle until all safety precautions have been read and understood.
P261: Avoid breathing dust/fumes.
P281: Use personal protective equipment as required.
P308+P313: If exposed or concerned: Get medical advice/attention.

Potential Health Effects

Eye Contact
Dusts or particulates may cause mechanical irritation including pain, tearing, and redness. Scratching of the cornea can occur if eye is rubbed. Fumes may be irritating. Contact with the heated material may cause thermal burns.

Skin Contact
Dusts or particulates may cause mechanical irritation due to abrasion. Coated steel may cause skin irritation in sensitive individuals (see Section 16 for additional information.) Some components in this product are capable of causing an allergic reaction, possibly resulting in burning, itching and skin eruptions. Contact with heated material may cause thermal burns.

Inhalation
Dusts may cause irritation of the nose, throat, and lungs. Excessive inhalation of metallic fumes and dusts may result in metal fume fever, an influenza-like illness. It is characterized by a sweet or metallic taste in the mouth, accompanied by dryness and irritation of the throat, cough, shortness of breath, pulmonary edema, general malaise, weakness, fatigue, muscle and joint pains, blurred vision, fever and chills. Typical symptoms last from 12 to 48 hours.

Ingestion
Not expected to be acutely toxic via ingestion based on the physical and chemical properties of the product. Swallowing of excessive amounts of the dust may cause irritation, nausea, and diarrhea.

Potential Fire and Explosion Hazards
Under normal conditions, steel products do not present fire or explosion hazards, and dust generated by handling steel products is oxidized and not combustible. Processing of steel product by some individual customers may produce potentially combustible dust that may represent a fire or explosion hazard.

Chronic or Special Toxic Effects
Repeated exposure to fine dusts may inflame the nasal mucosa and cause changes to the lung. In addition, a red-brown pigmentation of the eye and/or skin may occur. Welding fumes have been associated with adverse health effects. Contains components that may cause cancer or reproductive effects. The following components are listed by NTP, OSHA, or IARC as carcinogens: Nickel, chromium (hexavalent), cobalt, lead, cadmium, antimony (trioxide), arsenic, beryllium. See Section 11, for additional, specific information on effects noted above.

Target Organs
Overexposure to specific components of this product that are generated in dusts or fumes may cause adverse effects to the following organs or systems: eyes, skin, liver, kidney, central nervous system, cardiovascular system, respiratory system,.

Medical Conditions Aggravated by Exposure
Diseases of the skin such as eczema may be aggravated by exposure. Also, disorders of the respiratory system including asthma, bronchitis, and emphysema. Long-term inhalation exposure to agents that cause pneumoconiosis (e.g. dust) may act synergistically with inhalation of oxide fumes or dusts of this product.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS No.	% Weight	Exposure Limits			
			ACGIH TLV (mg/m^3)		OSHA PEL (mg/m^3)	
Base Metal:						
Iron (Fe)	7439-89-6	Balance	5	Oxide Dust/Fume	10	Oxide Dust/Fume
Alloying Elements						

Components		CAS No.	% Weight	Exposure Limits			
				ACGIH TLV (mg/m^3)		OSHA PEL (mg/m^3)	
Aluminum	(Al)	7429-90-5	0-3.0	10 5	Dust Fume	15 5	Dust Respirable fraction
Antimony	(Sb)	7440-36-0	<0.9	0.5	As Antimony	0.5	As Antimony
Arsenic	(As)	7440-38-2	<0.09	0.01	As Arsenic (A1 Carcinogen)	0.01	As Arsenic
Beryllium	(Be)	7440-41-7	<0.09	0.002 0.01	As Beryllium (A1 Carcinogen) As Beryllium (STEL)	0.002 0.005	As Beryllium As Beryllium (Ceiling)
Boron	(B)	7440-42-8	<1.1	10	Oxide Dust	15	Oxide Dust
Cadmium	(Cd)	7440-43-9	<0.01	0.01 0.002	As Cadmium (A2 Carcinogen) Respirable fraction	0.005 0.0025	As Cadmium As Cadmium (Action Level)
Calcium	(Ca)	1305-78-8	<0.9	2	Oxide Dust	5	Oxide Dust
Carbon	(C)	7440-44-0	<1.0		Not Established		Not Established
Chromium	(Cr)	7440-47-3	0.01-12.5	0.5	Metal	1	Metal
Cobalt	(Co)	7440-48-4	<0.09	0.02	As Cobalt (A3 Carcinogen)	0.1	Metal/Dust/Fume
Copper	(Cu)	7440-50-8	<3.5	1 0.2	Dust Fume	1 0.1	Dust Fume
Lead	(Pb)	7439-92-1	0.0-0.04	0.05	Dust / Fume (A3 Carcinogen)	0.05	Dust / Fume
Magnesium	(Mg)	7439-95-4	<0.9		Not Established		Not Established
Manganese	(Mn)	7439-96-5	<16.0	0.2	Elemental Mn and Inorg Compounds	5	Fume (Ceiling)
Molybdenum	(Mo)	7439-98-7	<1.1	10	Insoluble Compounds	15	Insoluble Compounds
Niobium	(Nb)	7440-03-1	<0.9		Not Established		
Nickel	(Ni)	7440-02-0	0.01-3.0	1.5	Metal	1	Metal and Insoluble Compounds
Nitrogen	(N)	7727-37-9	<0.9		Simple Asphyxiant		Simple Asphyxiant
Phosphorus	(P)	7723-14-0	<0.9	0.1	Phosphorus	0.1	Phosphorus
Selenium	(Se)	7782-49-2	<0.9	0.2	Selenium	0.2	Selenium
Silicon	(Si)	7440-21-3	0.0-5.0	10	Dust	15	Dust
Sulfur	(S)	7446-09-05	<0.9	5.2 13	Sulfur Dioxide Sulfur Dioxide (STEL)	13	Sulfur Dioxide
Tin	(Sn)	7440-31-5	<0.9	2	Metal,Oxide and Inorganic Compounds	2	Inorganic Compounds
Titanium	(Ti)	7440-32-6	<0.9		Not Established		Not Established
Tungsten	(W)	7440-33-7	<0.9	5 10	Insoluble Compounds as W Insoluble Compounds as W (STEL)		Not Established
Vanadium	(V)	7440-62-2	<0.9	0.05	Oxide Dust/Fume	0.5 0.1	Oxide Dust (Ceiling) Oxide Fume (Ceiling)
Zinc	(Zn)	7440-66-6	0.0-0.1	10 5 10	Oxide Dust OxideFume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust
Coatings and Finishing Treatments:							
Hydrochloric Acid	(HCl)	7647-01-0	<3				
Petroleum, Natural or Synthetic oils		Mixture	<0.1	5	Mist	5	Mist
Anhydrous Potassium Hydroxide		1310-58-3	<0.01	2	Ceiling	2	Ceiling
Glycine,nn-1,2-ethanediylbis		60-00-4	<0.01				
Polyalkylene glycol		Mixture	<0.01				

Components	CAS No.	% Weight	Exposure Limits			
			ACGIH TLV (mg/m^3)		OSHA PEL (mg/m^3)	
Sodium nitrite	7632-00-0	<0.01	10	Oxide Dust		
Zinc (galvanized)	7440-66-6	0.4 - 10	5 10	OxideFume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust

NOTE: No permissible exposure limits (PEL) or threshold limit values (TLV) exist for steel over all. The above listing is a summary of elements used in normal Nucor Steel Products. Various grades of steel will contain different combinations of these elements and/or trace materials. Exact specifications for specific products may be available upon request.

4. FIRST AID MEASURES

Eye Contact- In case of overexposure to dusts or fumes, immediately flush eyes with plenty of water for at least 15 minutes occasionally lifting the eye lids. Get medical attention if irritation persists. Thermal burns should be treated as medical emergencies.
Skin Contact - In case of overexposure to dusts or particulates, wash with soap and plenty of water. Get medical attention if irritation develops or persists. If thermal burn occurs, flush area with cold water and get immediate medical attention.
Inhalation - In case of overexposure to dusts or fumes, remove to fresh air. Get immediate medical attention if symptoms described in this SDS develop.
Ingestion - Not considered an ingestion hazard. However, if excessive amounts of dust or particulates are swallowed, treat symptomatically and supportively. Get medical attention.
Notes to Physician - Inhalation of metal fume or metal oxides may produce an acute febrile state, with cough, chills, weakness, and general malaise, nausea, vomiting, muscle cramps, and remarkable leukocytosis. Treatment is symptomatic, and condition is self limited in 24-48 hours. Chronic exposure to dusts may result in pneumoconiosis of mixed type.

5. FIRE FIGHTING MEASURES

Flash Point (Method) - Not applicable
Flammable Limits (% volume in air) - Not applicable
Auto ignition Temperature - Not applicable
Extinguishing Media - For molten metal, use dry powder or sand. For steel dust use or dry sand, water, foam, argon or nitrogen.
Special Fire Fighting Procedures - Do not use water on molten metal. Do not use Carbon Dioxide (CO_2). Firefighters should not enter confined spaces without wearing NIOSH/MSHA approved positive pressure breathing apparatus (SCBA) with full face mask and full protective equipment.
Unusual Fire or Explosion Hazards - Steel products do not present fire or explosion hazards under normal conditions. Any non-oxidized fine metal particles/ dust generated by grinding, sawing, abrasive blasting, or individual customer processes may produce materials that the customer should test for combustibility and other hazards in accordance with applicable regulations. High concentrations of combustible metallic fines in the air may present an explosion hazard.

6. ACCIDENTAL RELEASE MEASURES

Precautions if Material is Spilled or Released - Emergency response is unlikely unless in the form of combustible dust. Avoid inhalation, eye, or skin contact of dusts by using appropriate precautions outlined in this SDS (see section 8). Fine turnings and small chips should be swept or vacuumed and placed into appropriate disposable containers. Keep fine dust or powder away from sources of ignition. Scrap should be reclaimed for recycling. Prevent materials from entering drains, sewers, or waterways.
Fire and Explosion Hazards - Some customer processes may generate combustible dust that may require specific precautions when cleaning spills or releases of dust.
Environmental Precautions - Some grades of steel may contain reportable quantities of alloying elements. See Section 15 for additional information.
Waste Disposal Methods - Dispose used or unused product in accordance with applicable Federal, State, and Local regulations. Please recycle.

7. HANDLING AND STORAGE

Storage Temperatures - Stable under normal temperatures and pressures.
Precautions to be Taken in Handling and Storing - Store away from strong oxidizers. Dusts and/or powders, alone, or combined with process specific fluids, may form explosive mixtures with air. Applicable Federal, state and local laws and regulations may require testing dust generated from processing of steel products to determine if it represents a fire or explosion hazard and to determine appropriate protection methods. Avoid breathing dusts or fumes.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Operations with potential for generating high concentrations of airborne particulates or fumes should be evaluated and controlled as necessary.
Eye Protection - Use safety glasses. Dust resistant safety goggles are recommended under circumstances where particles could cause mechanical injury such as grinding or cutting. Face shield should be used when welding or cutting.
Skin - Appropriate protective gloves should be worn as necessary. Good personal hygiene practices should be followed including cleansing exposed skin several times daily with soap and water, and laundering or dry cleaning soiled work clothing.
Respiratory Protection - NIOSH/MSHA approved dust/fume/mist respirator should be used to avoid excessive exposure. See Section 3 for component material information exposure limits. If such concentrations are sufficiently high that this respirator is inadequate, or high enough to cause oxygen deficiency, use a positive pressure self-contained breathing apparatus (SCBA). Follow all applicable respirator use, fitting, and training standards and regulations.
Ventilation - Provide general and/or local exhaust ventilation to control airborne levels of dust or fumes below exposure limits.
Exposure Guidelines - No permissible exposure limits (PEL) or threshold limit values (TLV) exist for steel. See Section 3 for component materials. Various grades of steel will contain different combinations of these elements. Trace elements may also be present in minute amounts.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor – Silver grey to grey black with metallic luster.
Boiling Point - Not applicable
Melting Point - Approximately 2800 ^{o}F
pH - Not applicable
Specific Gravity (at 15.6^{o}C) - Not applicable
Density (at 15.6 ^{o}C) - Not applicable
Vapor Pressure - Not applicable
Vapor Density (air = 1) - Not applicable
% Volatile, by Volume - Not applicable
Solubility in Water - Insoluble.
Evaporation Rate (Butyl Acetate = 1) - Not applicable
Other Physical and Chemical Data - None

10. STABILITY AND REACTIVITY

Stability - Stable
Conditions to Avoid - Steel at temperatures above the melting point may liberate fumes containing oxides of iron and alloying elements. Avoid generation of airborne fume.
Hazardous Polymerization - Will not occur.
Incompatibility (Materials to Avoid) - Reacts with strong acids to form hydrogen gas. Do not store near strong oxidizers.
Hazardous Decomposition Products - Metallic fumes may be produced during welding, burning, grinding, and possibly machining or any situation with the potential for thermal decomposition. Refer to ANSI Z49.1

11. TOXICOLOGICAL INFORMATION

The primary component of this product is iron. Long-term exposure to iron dusts or fumes can result in a condition called siderosis which is considered to be a benign pneumoconiosis. Symptoms may include chronic bronchitis, emphysema, and shortness of breath upon exertion. Penetration of iron particles in the skin or eye may cause an exogenous or ocular siderosis which may be characterized by a red-brown pigmentation of the affected area. Ingestion overexposures to iron may affect the gastrointestinal, nervous, and hematopoietic system and the liver. Iron and steel founding, but not iron or iron oxide, has been listed as carcinogenic (Group 1) by IARC.

When this product is welded, fumes are generated. Welding fumes may be different in composition from the original welding product, with the chief component being ordinary oxides of the metal being welded. Chronic health effects (including cancer) have been associated with the fumes and dusts of individual component metals (see above), and welding fumes as a general category have been listed by IARC as a carcinogen (Group 2B). There is also limited evidence that welding fumes may cause adverse reproductive and fetal effects. Evidence is stronger where welding materials contain known reproductive toxins, e.g., lead which may be present in the coating material of this product.

Breathing fumes or dusts of this product may result in metal fume fever, which is an illness produced by inhaling metal oxides. These oxides are produced by heating various metals including cadmium, zinc, magnesium, copper, antimony, nickel, cobalt, manganese, tin, lead, beryllium, silver, chromium, aluminum, selenium, iron, and arsenic. The most common agents involved are zinc and copper.

This product may contain small amounts of manganese. Prolonged exposure to manganese dusts or fumes is associated with "manganism", a Parkinson-like syndrome characterized by a variety of neurological symptoms including muscle spasms, gait disturbances, tremors, and psychoses.

This product may contain small amounts of cadmium. Primary target organs for cadmium overexposure are the lung and the kidney. Because of its cumulative nature, chronic cadmium poisoning can cause serious disease which takes many years to develop and may continue to progress despite cessation of exposure. Progression of the disease may not reflect current exposure conditions. It is also capable of causing a painful osteomalacia called “Itai-Itai” in postmenopausal women, and has caused developmental effects and/or reproductive effects in male and female animals. Cadmium is a listed carcinogen by NTP, OSHA, and IARC (Group 1).

This product may contain small amounts of chromium. Prolonged and repeated overexposure to chromium dusts or fumes may cause skin ulcers, nasal irritation and ulceration, kidney damage and cancer of the respiratory system. Chromium is skin sensitizer. Cancer is generally attributed to the hexavalent (+6) form of chromium which is listed as a carcinogen by NTP and IARC (Group 1).

This product may contain small amounts of nickel. Prolonged and repeated contact with nickel may cause sensitization dermatitis. Inhalation of nickel compounds has caused lung damage as well as sinus, nasal and lung cancer in laboratory animals. Nickel is a listed carcinogen by NTP and IARC (Group 1).

This product may contain small amounts of vanadium. Adverse effects from dermal, inhalation or parenteral exposure to various vanadium compounds have been reported. The major target for vanadium pentoxide toxicity is the respiratory tract. Fumes or dust can cause severe eye and respiratory irritation, and systemic effects. Chronic bronchitis, green tongue, conjunctivitis, pharyngitis, rhinitis, rales, chronic productive cough, and tightness of the chest have been reported following overexposure. Allergic reactions resulting from skin and inhalation exposures have also been reported. A statistical association between vanadium air levels and lung cancer has been suggested, but vanadium currently is not regarded as a human carcinogen.

This product may contain small amounts of lead. Lead can accumulate in the body. Consequently, exposure to fumes or dust may produce signs of polyneuritis, diminished vision and peripheral neuropathy, such as tingling and loss of feeling in fingers, arms and legs. Lead is a known reproductive and developmental toxin. It is also associated with central nervous system disorders, anemia, kidney dysfunction and neurobehavioral abnormalities. The brain is a major target organ for lead exposure. Elemental lead is listed as an IARC 2B carcinogen.

The product may contain small amounts of copper. Copper dust and fumes can irritate the eyes, nose and throat causing coughing, wheezing, nosebleeds, ulcers and metal fume fever. Other effects from repeated inhalation of copper fumes include a metallic or sweet taste, and discoloration of skin, teeth or hair. Copper also may cause an allergic skin reaction. Overexposure to copper can affect the liver.

12. ECOLOGICAL INFORMATION

Aquatic Ecotoxicological Data - No specific information available on this product.
Environmental Fate Data - No specific information available on this product.

13. DISPOSAL CONSIDERATIONS

Recovery and reuse, rather than disposal, should be the ultimate goal of handling efforts. Dispose in accordance with federal, state, and local health and environmental regulations. Prevent materials from entering drains, sewers, or waterways.

14. TRANSPORT INFORMATION

DOT Proper Shipping Name - Not regulated
DOT Hazard Classification - Not regulated
UN/NA Number - Not applicable
DOT Packing Group - Not applicable
Labeling Requirements - Not applicable
Placards - Not applicable
DOT Hazardous Substance - Not applicable
DOT Marine Pollutant - Not applicable

15. REGULATORY INFORMATION

This product is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200. However, dusts and fumes from this product may be combustible or hazardous and require protection to comply with applicable Federal, state and local laws and regulations.

California Proposition 65: This product contains chemicals (antimony [oxide], arsenic, beryllium, chromium [hexavalent], cobalt, cadmium, lead, nickel) known to the State of California to cause cancer and chemicals (cadmium, lead) known to the State of California to cause birth defects or other reproductive harm.

Massachusetts Substance List: Aluminum, Antimony, Arsenic, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Hydrochloric acid, Lead, Magnesium, Manganese, Molybdenum, Nickel, Nitrogen, Phosphorus, Selenium, Silicon, Sulfur, Tin, Titanium, Tungsten, Vanadium, Zinc

Pennsylvania Hazardous Substance List: Aluminum, Antimony, Arsenic, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Hydrochloric acid, Lead, Magnesium, Manganese, Molybdenum, Nickel, Nitrogen, Phosphorus, Selenium, Silicon, Sulfur, Tin, Titanium, Tungsten, Vanadium, Zinc

New Jersey Hazardous Substance List: Aluminum, Antimony, Arsenic, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Hydrochloric acid, Lead, Magnesium, Manganese, Molybdenum, Nickel, Nitrogen, Phosphorus, Selenium, Silicon, Sulfur, Tin, Titanium, Tungsten, Vanadium, Zinc

Toxic Substances Control Act (TSCA)
Components of this product are listed on the TSCA Inventory.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
Steel is not reportable, however, it contains hazardous substances that may be reportable if released in pieces with diameters less than or equal to 0.004 inches (RQ marked with a "*").

Chemical Name	Reportable Quantity (in lb)
Antimony	5000*
Arsenic	1*

Chemical Name	Reportable Quantity (in lb)
Beryllium	10*
Cadmium	10*
Chromium	5000*
Copper	5000*
Lead	10*
Nickel	100*
Phosphorus	1
Selenium	100*
Zinc	1000*

Superfund Amendments and Reauthorization Act of 1986 (SARA), Title III

SECTION 311/312 HAZARD CATEGORIES: Immediate Health Effect, Delayed Health Effect

This product contains the following EPCRA Section 313 chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right – To – Know Act of 1986 (40 CFR 372):

SECTION 313 REPORTABLE INGREDIENTS:

Chemical Name	CAS Number	Concentration (% by weight)	Reportable
Aluminum	7429-90-5	0.0-0.01 Some grades up to 3.0%	Yes –Greater than 1%
Antimony	7440-36-0	<0.9	No – Less than 1%
Arsenic	7440-38-2	<0.09	No – Less than 0.1%
Beryllium	7440-41-7	<0.09	No – Less than 0.1%
Cadmium	7440-43-9	<0.01	No – Less than 0.1%
Chromium	7440-47-3	0.01-1.0 Some grades up to 12.5%	Yes – Greater than 0.1%
Cobalt	7440-48-4	<0.09	No – Less than 0.1%
Copper	7440-50-8	<0.9 Some grades up to 3.5%	Yes –Greater than 1%
Lead	7439-92-1	0.0-0.04	Yes
Manganese	7439-96-5	0.2-2 Some grades up to 16.0%	Yes – Greater than 1%
Nickel	7440-02-0	0.01-0.1 Some grades up to 3.0%	Yes – Greater than 0.1%
Phosphorus	7723-14-0	<0.9	No – Less than 1%
Selenium	7782-49-2	<0.9	No – Less than 1%
Vanadium	7440-62-2	<0.9	No – Less than 1%
Zinc	7440-66-6	<0.01	No – Less than 1%

Concentrations based on analytical data and process knowledge of typical products distributed by the facility.

16. OTHER INFORMATION

This SDS covers Nucor product as delivered from the Nucor facility, but does not include chemicals that may be applied by subsequent handlers and/or distributors of this product. This could include a variety of materials including oils, paints, galvanization, etc. that are not included in this SDS. Additionally, specialty orders may require application of coating material not listed in this SDS. SDSs for any Nucor-applied specialty coating will be provided separately. During welding, precautions should be taken for airborne contaminants that may originate from components of the welding rod. Arc or spark generated when welding or burning could be a source of ignition for combustible and/or flammable materials. The information in this Safety Data Sheet (SDS) was obtained from sources which we believe are reliable; however, the information is provided without any representation or warranty, expressed or implied, regarding the accuracy or correctness. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with the handling, storage, use, or disposal of this product.

SAFETY DATA SHEET

1. Identification

Product identifier **Cold Rolled Galvanized**

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

Vanadium pentoxide**	1314-62-1	0
Zinc oxide**	1314-13-2	0

The product is an alloy. May liberate hazardous oxides such as iron oxides and vanadium pentoxide at temperatures above the melting point. The surface is galvanized with zinc. The surface may be passivated with chromic acid leaving residual coating of chrome III and VI compounds. The product may be coated with acrylic coating. The steel is treated with mineral oil.

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. **Zinc oxide fumes may be formed during burning, cutting, or welding.

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. 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). 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/m3	
Iron oxide** (CAS 1309-37-1)	PEL	10 mg/m3	Fume.
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m3	Fume.
Nickel (CAS 7440-02-0)	PEL	1 mg/m3	
Silicon (CAS 7440-21-3)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Vanadium pentoxide** (CAS 1314-62-1)	Ceiling	0.5 mg/m3	Respirable dust.
		0.1 mg/m3	Fume.
Zinc oxide** (CAS 1314-13-2)	PEL	5 mg/m3	Respirable fraction.
		5 mg/m3	Fume.
		15 mg/m3	Total dust.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Chromium (CAS 7440-47-3)	TWA	0.5 mg/m3	
Iron oxide** (CAS 1309-37-1)	TWA	5 mg/m3	Respirable fraction.
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Vanadium pentoxide** (CAS 1314-62-1)	TWA	0.05 mg/m3	Inhalable fraction.
Zinc oxide** (CAS 1314-13-2)	STEL	10 mg/m3	Respirable fraction.
	TWA	2 mg/m3	Respirable fraction.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Chromium (CAS 7440-47-3)	TWA	0.5 mg/m3	
Iron oxide** (CAS 1309-37-1)	TWA	5 mg/m3	Dust and fume.
Manganese (CAS 7439-96-5)	STEL	3 mg/m3	Fume.
	TWA	1 mg/m3	Fume.
Nickel (CAS 7440-02-0)	TWA	0.015 mg/m3	
Silicon (CAS 7440-21-3)	TWA	5 mg/m3	Respirable.
		10 mg/m3	Total
Vanadium (CAS 7440-62-2)	STEL	3 mg/m3	
	TWA	1 mg/m3	
Vanadium pentoxide** (CAS 1314-62-1)	Ceiling	0.05 mg/m3	Fume.
		0.05 mg/m3	Dust.
Zinc oxide** (CAS 1314-13-2)	Ceiling	15 mg/m3	Dust.
	STEL	10 mg/m3	Fume.
	TWA	5 mg/m3	Fume.
		5 mg/m3	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. **Zinc oxide fumes may be formed during burning, cutting, or welding.

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. High concentrations of freshly-formed fumes of zinc oxide can produce symptoms of metal fume fever.

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

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 Maganese: 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). 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. 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.

Components		Species	Test Results
Zinc oxide** (CAS 1314-13-2)			
Aquatic			
Crustacea	LC50	Water flea (Daphnia magna)	0.098 mg/l, 48 hours

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.

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
Zinc oxide** (CAS 1314-13-2)	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)
Zinc oxide** (CAS 1314-13-2)

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)
Zinc oxide** (CAS 1314-13-2)

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)
Zinc oxide** (CAS 1314-13-2)

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)
Zinc oxide** (CAS 1314-13-2)

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.