



SAFETY DATA SHEET

1. Identification

Product Identifier Carbon Steel (All Grades) Billet/Rod/Reinforcing Bar
Bar Stock/Angles/Wire

Other Means of Identification

SDS Number 1

Issue Date May 27, 2015

Product Code Carbon Steel (All Grades)

Recommended Use Varies by user application

Recommended Restrictions None Known

Manufacturer/Importer/Supplier/Distributor Information

Company Name Keystone Steel & Wire

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Emergency Number 309-697-7020

2. Hazard(s) Identification

Emergency Overview Steel products as sold by Keystone 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 fume, 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)



Pictograms

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 exposure or repeated exposure.

Precautionary Statements

P202 – Do not handle until all safety precautions have been read and understood

P261 – Avoid breathing dusts/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 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. 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 excessive amounts of the dust may cause irritation, nausea, and diarrhea.
Medical Conditions aggravated by exposure	Diseases of the skin such as eczema may be aggravated by exposure. Disorders of the respiratory system including asthma, bronchitis, and emphysema may be aggravated by exposure. Long-term inhalation exposure to agents that cause pneumoconiosis may act synergistically with inhalation of oxide fumes or dusts of this product.

3. Composition/Information On Ingredients

Chemical Name	CAS Number	% (weight)
Iron Oxide	7439-89-6	99
Manganese	7439-96-5	0.22-1.6
Carbon	7440-44-0	0.04-0.85
Boron	7440-42-8	0.2-0.8
Chromium	7440-47-3	0.04-0.95
Silicon	7440-21-3	0.04-0.6
Nickel	7440-02-0	0.05-0.49
Copper	7440-50-8	0.06-0.45
Molybdenum	7439-98-7	0.01-0.23
Vanadium	7440-62-2	0.01-0.06
Aluminum	7429-90-5	<1
Sulfur	7704-34-9	0.01-0.04
Tin	7440-31-5	0.01-0.04
Nitrogen	7727-37-9	0.003-0.012
Niobium	7440-03-1	0.001-0.04
Phosphorus	7723-14-0	0.005-0.03
Thallium	7440-28-0	0.001-0.002
Antimony	7440-36-0	<1
Arsenic	7440-38-2	<1

Barium	7440-39-3	<1
Beryllium	7440-41-7	<1

Chemical Name	CAS Number	%(weight)
Cadmium	7440-43-9	<1
Lead	7439-92-1	<1
Mercury	7439-97-6	<1
Selenium	7782-49-2	<1
Silver	7440-22-4	<1
Zinc	7440-66-6	<1

4. First Aid Measures

Inhalation In case of overexposure to dusts or fumes, remove to fresh air. Get immediate medical attention if symptoms described in the SDS develop.

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.

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.

Ingestion Not considered an ingestion hazard. However, if excessive amounts of dusts or particulates are swallowed, treat symptomatically and supportively. Get medical attention.

5. Fire Fighting Measures

Suitable Extinguishing Media For molten metal, use dry powder or sand. DO NOT USE WATER ON MOLTEN METAL. For steel dust, use dry sand, water, foam, argon or nitrogen.

Unsuitable Extinguishing Media DO NOT USE WATER ON MOLTEN METAL. DO NOT USE CARBON DIOXIDE (CO₂)

Specific Hazards arising from

the chemical

Metal fumes and noxious gases may be produced when heated.

Special Protective Equipment and

precautions for firefighters

DO NOT USE WATER ON MOLTEN METAL. DO NOT USE CARBON DIOXIDE (CO₂). Firefighters should not enter confined spaces without wearing NIOSH/MSHA approved positive pressure breathing apparatus (SCBA) with full face mask and full protective equipment.

Firefighting Equipment/

Instructions

DO NOT USE WATER ON MOLTEN METAL. DO NOT USE CARBON DIOXIDE (CO₂).

Specific Methods

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

General Fire Hazards

Steel products do not present fire or explosion hazards under normal conditions. Any non-oxidized fine metal particulates/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

Personal precautions, protective

equipment and emergency

procedures

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). Specific standards and regulations may be applicable to materials generated by individual customer processes. As appropriate, these standards and regulations should be consulted for applicability.

Methods and materials for**containment and clean up**

Fine turnings and small chips should be swept or vacuumed and placed into appropriate disposable containers. Fine dust or powder should be kept away from ignition sources. Scrap should be reclaimed for recycling.

Environmental precautions

Prevent materials from entering drains, sewers or waterways.

7. Handling and Storage**Precautions for safe handling**

Store away from strong oxidizers. Dusts and/or powders, alone or combined with process specific fluids may form explosive mixtures with air. Avoid breathing dusts or fumes. 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.

Conditions for safe storage,**including incompatibilities**

Store away from strong oxidizers.

8. Exposure Controls/Personal Protection**Occupational Exposure Limits**

Component	Type	Value	Form
Iron	PEL	10 mg/m³	Dust/Fume
Manganese	CEILING	5 mg/m³	Fume
Carbon		Not Established	
Boron	PEL	15 mg/m³	Oxide Dust
Chromium	PEL	1 mg/m³	Metal
Silicon	PEL	15 mg/m³	Dust
Nickel	PEL	1 mg/m³	Metal/Insoluble
Copper	PEL	1 mg/m³	Dust
	PEL	0.1 mg/m³	Fume

Component	Type	Value	Form
Molybdenum	PEL	15 mg/m ³	Insoluble Compounds
Vanadium	CEILING	0.5 mg/m ³	Oxide Dust
	CEILING	0.1 mg/m ³	Oxide Fume
Aluminum	PEL	15 mg/m ³	Dust
	PEL	5 mg/m ³	Respirable Fraction
Sulfur	PEL	13 mg/m ³	Sulfur Dioxide
Tin	PEL	2 mg/m ³	Inorganic Compound
Nitrogen			Simple Asphyxiant
Niobium		Not Established	
Phosphorus	PEL	0.1 mg/m ³	Phosphorus
Thallium	PEL	0.1 mg/m ³	Thallium
Antimony	PEL	0.5 mg/m ³	Antimony
Arsenic	PEL	0.01 mg/m ³	Arsenic
Barium	PEL	0.5 mg/m ³	Barium
Beryllium	PEL	0.002 mg/m ³	Beryllium
	CEILING	0.005 mg/m ³	Beryllium
Cadmium	PEL	0.005 mg/m ³	Cadmium
	AL	0.0025 mg/m ³	Cadmium
Lead	PEL	0.05 mg/m ³	Dust/Fume
Mercury	CEILING	1 mg/10 m ³	Mercury
Selenium	PEL	0.2 mg/m ³	Selenium
Silver	PEL	0.1 mg/m ³	Metal
Zinc	PEL	5 mg/m ³	Oxide Fume
	PEL	10 mg/m ³	Oxide Dust

Appropriate engineering controls Operations with potential for generating high concentrations of airborne particulates or fumes should be evaluated and controlled as necessary.

Individual protective measures

Eye/Face 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 protection

Hand Appropriate protective gloves should be worn as necessary.

Other Good personal hygiene should be followed including cleansing exposed skin with soap and water, and laundering 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 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.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

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.

9. Physical and Chemical Properties

Appearance

Physical State Solid

Form

Color Silver grey to grey black with metallic luster

Odor	Not applicable
Odor Threshold	Not applicable
pH	Not applicable
Melting Point/Freezing Point	Approximately 2800 F/Not applicable
Initial boiling point/range	Not applicable
Flash point	Not applicable
Evaporation rate	Not applicable
Flammability	Non combustible
Lower Flammability Limit	Not applicable
Upper Flammability Limit	Not applicable
Vapor Pressure	Not applicable
Vapor Density	Not applicable
Relative Density	7.85 g/cm ³ (+/- 10%)
Solubility	
Solubility (water)	Insoluble
Partition coefficient	Not applicable
Auto-ignition Temperature	Not applicable
Decomposition Temperature	Not applicable
Viscosity	Not applicable
Other information	
Explosive properties	Not explosive
Oxidizing properties	

10. Stability and Reactivity

Reactivity	This product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical Stability	Material is stable under normal conditions

Possibility of hazardous reactions	Steel at temperatures above the melting point may release fumes containing oxides of iron and alloying elements. Avoid generation of airborne fumes.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	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.

11. Toxicological Information

Information on likely routes of exposure

Inhalation	Dust and/or fumes generated during welding, burning, grinding and possibly machining may irritate respiratory system
Skin contact	Dust may irritate skin
Eye contact	Dust may irritate eyes
Ingestion	Expected to be a low ingestion hazard

Symptoms related to physical, chemical and toxicological characteristics

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, 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 this material.

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 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 and fumes may cause skin ulcers, nasal irritation and ulceration, kidney damage and cancer of the respiratory system. Chromium is a skin sensitizer. Cancer is generally attributed to the hexavalent 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 as 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 may cause an allergic skin reaction. Overexposure to Copper can affect the liver.

12. Ecological Information

Aquatic Ecotoxicological Data

No specific information available for this product.

Environmental Fate Data No specific information available for this product.

13. Disposal Considerations

Disposal Instructions Recovery and recycle, rather than disposal, should be the ultimate goal of handling efforts. If recycling is not an option, dispose of the material in accordance with all applicable regulations.

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

US Federal Regulations 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, arsenic, beryllium, chromium, 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 reproductive harm.

Massachusetts Substance List Aluminum, Antimony, Arsenic, Beryllium, Boron, Cadmium, Chromium, Copper, Lead, Magnesium, Manganese, Molybdenum, Nickel, Nitrogen, Phosphorus, Selenium, Silicon, Sulfur, Tin, Vanadium, Zinc.

Pennsylvania Hazardous Substance Aluminum, Antimony, Arsenic, Beryllium, Boron, Cadmium, Chromium, Copper, Lead, Magnesium, Manganese, Molybdenum, Nickel, Nitrogen, Phosphorus, Selenium, Silicon, Sulfur, Tin, Vanadium, Zinc.

New Jersey Hazardous Substance Aluminum, Antimony, Arsenic, Beryllium, Boron, Cadmium, Chromium, Copper, Lead, Magnesium, Manganese, Molybdenum, Nickel, Nitrogen, Phosphorus, Selenium, Silicon, Sulfur, Tin, Vanadium, Zinc.

Toxic Substances Control Act Components of this product are listed on the Toxic Substances Control Act.

Comprehensive Environmental Response, Compensation and Liability Act

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. An (*) denotes the Reportable Quantity.

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

Section 313 Reportable Ingredients

Chemical Name	Reportable
Aluminum	No – less than 1%
Antimony	No – less than 1%
Arsenic	No – less than 1%
Beryllium	No – less than 1%
Cadmium	No – less than 1%
Chromium	Yes – greater than 1%
Copper	No – less than 1%
Lead	Yes
Manganese	Yes – greater than 1%
Nickel	Yes – greater than 1%
Phosphorus	No – less than 1%
Selenium	No – less than 1%
Vanadium	No – less than 1%
Zinc	No – less than 1%

16. Other Information

This SDS covers Keystone Steel & Wire product delivered from the Keystone 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 listed in this SDS. SDSs for any Keystone-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 was obtained from sources which we believe are reliable, however, the information is provided without any representation or warranty, expressed or implied, regarding 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.