

METALS

- Cadmium
- Galvanized Metal
- Lead
- Manganese
- Nickel
- Stainless
- Zinc

Hazard Description:

Solid metals are often overlooked chemical hazards because they are generally exempted from coverage by the OSHA Hazard Communication Standard. But metals lose their exemption when they are welded, brazed, burned, ground, sand/shot blasted or cut.

Metals differ in their hazardous properties. Some are flammable, such as magnesium. Some metals are carcinogens (nickel and chromium). Other metals, lead and zinc, generate toxic fumes, gases and dusts when involved in welding, burning, or grinding work.

Lead accumulates in the body. It affects the central nervous system, the blood, the gastrointestinal tract and the kidneys. Lead is considered to be a hemotoxin, that is, it can cause anemia and blood poisoning.

Zinc oxide, produced during the welding of galvanized steel, is the metal compound commonly associated with metal fume fever, a "flu-like" reaction that occurs four to twelve hours after exposure. Early symptoms of metal fume fever are a sweat or metallic taste in the mouth followed by dryness and irritation of the throat. This may be accompanied by coughing, shortness of breath, weakness, fatigue, and pains in the muscles and joints. Fever and shaking chills sometimes develop, usually lasting between 24 and 48 hours.

Excessive and repeated overexposure to manganese fumes can cause bronchitis, pneumonitis, and lack of coordination. Copper fumes can affect the pulmonary system. Cadmium fume and dust is highly toxic.

Some beams and steel piling are coated with an anti-corrosive coating, which may pose a health hazard when removed through grinding, burning, or welding. Generally in new work, the manufacturer will provide some indication of the hazard potential of the coating.

When the welding, brazing, grinding or cutting of metal is performed, care should be taken to avoid inhalation of fumes or metal dusts. Local exhaust ventilation should be used to reduce your exposure. If fumes and dust cannot be controlled with exhaust ventilation, appropriate approved respirators should be used.

METALS - CONTINUED

It is important to determine the components of the metal being worked before welding, burning, or grinding. The MSDS which accompanies a metal product will provide information allowing the user to make an informed decision on the appropriate personal protective equipment necessary for work with that material.

Avoid generation of airborne metal dust. Do not use compressed air to clean work surfaces. Metal chips and granules of metal dust should be swept or vacuumed.

Approved safety goggles and gloves should be worn when working with metals. Gloves may be necessary to prevent skin sensitization and dermatitis.

This Safety Data Sheet complies with Regulation (EC) No. 1907/2006, ISO 11014-1 and ANSI Z400.1

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: ALL-STATE BRAZING AND SOLDERING ALLOYS
100 P/Ns: 69050197, 69050201, 69050300, 69050207, 69050218
101 Cadmium Free P/Ns: 69050352, 69050354, 69050353, 69050400, 69050244, 69050401
101 FC Cadmium Free P/Ns: 69050410, 69050245, 69050411, 69050263
125 P/Ns: 69050161
155 P/Ns: 69050190, 69050191, 69050272, 69050277, 69050307, 69050273
155 FC P/Ns: 69050130, 69050280, 69050131, 69050281
Strongset® 390 Solder P/Ns: 69070064, 69070065
Strongset® 509 Solder P/Ns: 69070028, 69070050, 69070051, 69070053
Bi-Metal P/Ns: 69050220
Tri-Metal P/Ns: 69050222

Application: Brazing and Soldering Wires, Rods and Strip
Classification: None
Supplier: THE ESAB GROUP, INC., 801 Wilson Avenue, Hanover, PA 17331
Telephone No.: 1-717-637-8911, 1-800-933-7070
Emergency No.: 1-717-637-8911 and 1-800-424-9300 (CHEMTREC)
Web site: www.esabna.com

2. HAZARDS IDENTIFICATION

Emergency Overview: Metallic wires, rods, flux coated rods or strip in varying colors. These products are normally not considered hazardous as shipped. Gloves should be worn when handling to prevent cuts and abrasions and contaminating hands with product dust.

Some of these products contain nickel, which is classified as toxic by prolonged inhalation, a skin sensitizer and a suspect carcinogen. In the form that nickel is present in these products it does not contribute to a hazard classification of the products.

Avoid eye contact or inhalation of dust from some of these products. Skin contact is normally no hazard but should be avoided to prevent possible allergic reactions. Skin contact may cause an allergic reaction to individuals sensitized to nickel metals.

Persons with a pacemaker should not go near brazing or soldering operations until they have consulted their doctor and obtained information from the manufacturer of the device.

When these products are used in a brazing or soldering process, the most important hazards are heat, radiation, electric shock and brazing and soldering fumes.

Heat: Spatter and melting metal can cause burn injuries and start fires.

Radiation: Arc rays can severely damage eyes or skin.

Electricity: Electric shock can kill.

Fumes: Overexposure to brazing and soldering fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes. Chronic overexposure to brazing and soldering fumes may affect pulmonary function. Prolonged inhalation of nickel, chromium and cadmium compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. Some individuals may develop blue-gray skin pigmentation from exposure to silver (argyria). Cadmium may cause reproductive effects.

Flame Processing: When used with combustible gas equipment (e.g., oxy-acetylene torch), read the use and safety information for that equipment.

3. COMPOSITION/INFORMATION ON INGREDIENTS

These products are solid metal rods, flux coated (FC) metal rods, solid metal wires and strip.

Ingredients	REACH Reg. #	CAS#	EINECS#	Hazard classification ⁽¹⁾	IARC ⁽²⁾	NTP ⁽³⁾	OSHA List ⁽⁴⁾
Boric Acid	--	10043-35-3	233-139-2	Repr. Cat. 2; R60-61	--	--	--
Cadmium	--	7440-43-9	231-152-8	Carc. Cat. 2; R45 Muta. Cat. 3; R68 Repr. Cat. 3; R62-63 T; R48/23/25 T+; R26 N; R50-53	1	K	K
Copper	--	7440-50-8	231-159-6	No	--	--	--
Methacrylate/Aliphatic & Naphthenic Hydrocarbon Compound	--	Proprietary	--	No	--	--	--
Nickel	--	7440-02-0	231-111-4	Carc. Cat. 3; R40 T; R48/23 R43	2B	S	--
Potassium Bifluoride	--	7789-29-2	232-156-2	T; R25 C; R34	--	--	--
Potassium Pentaborate	--	11128-29-3	234-371-7	No	--	--	--
Potassium Tetraborate	--	1332-77-0	215-575-5	No	--	--	--
Silver	--	7440-22-4	213-131-3	No	--	--	--
Sodium Dodecyl Sulfate	--	151-21-3	205-788-1	No	--	--	--
Tin	--	7440-31-5	231-141-8	No	--	--	--
Zinc	--	7440-66-6	231-175-3	F; R15-17 N; R50-53	--	--	--

- (1) Hazard Classification according to European Council Directive 67/548/EEC, for R-phrases, see Section 16.
- (2) Evaluation according to the International Agency for Research on Cancer.
 1 –Carcinogenic to humans. 2A – Probably carcinogenic to humans. 2B – Possibly carcinogenic to humans.
- (3) Classification according to the 11th Report on Carcinogens, published by the US National Toxicology Program.
 K – Known Carcinogen S – Suspect Carcinogen
- (4) Carcinogen listing according to OSHA, Occupational Safety & Health Administration (USA).

APPROXIMATE COMPOSITION (Wt.%)

All-State Product Trade Name	100	101 Cadmium Free	101 FC Cadmium Free	125	155
Boric Acid	--	--	1-10	--	--
Cadmium	--	--	--	--	--
Copper	30	30	22-27	43	22
Methacrylate/Aliphatic & Naphthenic Hydrocarbon Compound	--	--	Proprietary	--	--
Nickel	2	--	--	--	--
Potassium Bifluoride	--	--	2-8	--	--
Potassium Pentaborate	--	--	0.1-2	--	--
Potassium Tetraborate	--	--	3-13	--	--
Silver	40	45	30-40	25	56
Sodium Dodecyl Sulfate	--	--	<0.2	--	--
Tin	--	--	--	--	7-13
Zinc	28	25	18-23	30	17



All-State Product Trade Name	155 FC	Strongset 390 Solder	Strongset 509 Solder	Bi-Metal	Tri-Metal
Boric Acid	2-15	--	--	--	--
Cadmium	--	--	80-85	--	7-9
Copper	12-17	--	--	20-40	57-58
Methacrylate/Aliphatic & Naphthenic Hydrocarbon Compound	Proprietary	--	--	--	--
Nickel	--	--	--	1-5	1-2
Potassium Bifluoride	5-15	--	--	--	--
Potassium Pentaborate	0.1-2	--	--	--	--
Potassium Tetraborate	8-18	--	--	--	--
Silver	30-40	--	--	40-54	24-26
Sodium Dodecyl Sulfate	<0.2	--	--	--	--
Tin	2-5	85-95	--	--	--
Zinc	8-13	<10	10-20	10-28	6-10

4. FIRST AID MEASURES

- Inhalation:** If breathing has stopped, perform artificial respiration and obtain medical assistance immediately! If breathing is difficult, provide fresh air and call physician.
- Eye contact:** For radiation burns due to arc flash, see physician. To remove dusts or fumes flush with water for at least fifteen minutes. If irritation persists, obtain medical assistance.
- Skin contact:** For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. To remove dust or particles wash with mild soap and water.
- Ingestion:** Call a physician or poison control center immediately. Do not induce vomiting unless directed to do so by a physician.
- Electric shock:** Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician.
- General:** Move to fresh air and call for medical aid.

5. FIRE FIGHTING MEASURES

No specific recommendations for brazing and soldering consumables. Brazing and soldering arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation. Wear self-contained breathing apparatus as fumes or vapors may be harmful.

6. ACCIDENTAL RELEASE MEASURES

Solid objects may be picked up and placed into a container. Liquids or pastes should be scooped up and placed into a container. Wear proper protective equipment while handling these materials. Do not discard as refuse.

- Personal precautions:** refer to Section 8.
- Environmental precautions:** refer to Section 13.

7. HANDLING AND STORAGE

Handling:

Handle with care to avoid stings and cuts. Wear gloves when handling brazing and soldering consumables. Avoid exposure to dust. Do not ingest.

Some individuals can develop an allergic reaction to certain materials. Retain all warning and identity labels.

Storage:

Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Avoid exposure to brazing and soldering fumes, radiation, spatter, electric shock, heated materials and dust.

Engineering measures: (Brazing and soldering operations)



Ensure sufficient ventilation, local exhaust, or both, to keep brazing and soldering fumes and gases from breathing zone and general area. Keep working place and protective clothing clean and dry. Train welders to avoid contact with live electrical parts and insulate conductive parts. Check condition of protective clothing and equipment on a regular basis.

Personal protective equipment: (Brazing and soldering operations)

Use respirator or air supplied respirator when brazing or soldering in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Use special care when brazing and soldering painted or coated steels since hazardous substances from the coating may be emitted. Wear hand, head, eyes, ear and body protection like welders gloves, helmet or face shield with filter lens, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry.

Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits. The following limits can be used as guidance. For information about brazing and soldering fume analysis refer to Section 10.

Substance	CAS#	ACGIH TLV ⁽¹⁾ mg/m ³	OSHA PEL ⁽²⁾ mg/m ³
Boric Acid (as borates)	10043-35-3	2 ***, 6 (STEL) ***	None
Cadmium (as Cd)	7440-43-9	0.01 0.002**	0.005
Copper (fume, as Cu)	7440-50-8	0.2	0.1
(dust and mists, as Cu)		1	1
Methacrylate/Aliphatic & Naphthenic Hydrocarbon Compound	Proprietary	None	None
Nickel, elemental	7440-02-0	1.5***	1
Potassium Bifluoride (as F)	7789-29-9	2.5	2.5
Potassium Pentaborate (as boron oxide fume)	11128-29-3	10	15*
Potassium Tetraborate (as boron oxide fume)	1332-77-0	10	15*
Silver (metal)	7440-22-4	0.1 (dust and fume)	0.01
Sodium Dodecyl Sulfate	151-21-3	None	None
Tin (metal)	7440-31-5	2	2
Zinc (metal)	7440-66-6	None	None

(1) Threshold Limit Values according to American Conference of Governmental Industrial Hygienists, 2014

(2) Permissible Exposure Limits according to the Occupational Safety & Health Administration (USA)

Unless noted, all values are for 8 hour time weighted averages (TWA).

* Total dust, ** Respirable fraction, *** Inhalable fraction.

NOTE: Some of these products may not contain all of the materials listed. For details of composition, refer to the COMPOSITION TABLES in Section 3.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Metallic rods, wires and strip in various colors.
Specific Gravity:	8-10 estimated.
Boiling Point:	Not determined.
Melting Point:	Not determined.
Vapor Pressure:	Not determined (solid).
Vapor Density:	Not determined (solid).
Evaporation Rate:	Not applicable.
Solubility in Water:	None for uncoated materials. Flux coating is slightly soluble.
Flash Point:	Not flammable.
Upper/Lower Flame Limit:	None.
Auto-ignition Temperature:	None.

10. STABILITY AND REACTIVITY

General:	These products are intended for normal brazing and soldering purposes.
Stability:	These products are stable under normal conditions.
Reactivity:	Contact with chemical substances like acids or strong bases could cause generation of gas.

When these products are used in a brazing or soldering process, hazardous decomposition products would include those from the volatilization, reaction or oxidation of the materials listed in Section 3 and those from the base metal and coating.

Fumes from these products may contain compounds of the following chemical elements: Ag, B, Cd, Cu, F, K, Ni, Sn and Zn. The rest is not analyzed, according to available standards.

Refer to applicable national exposure limits for fume compounds, including those exposure limits for fume compounds found in Section 8. A significant amount of the chromium in the fumes can be hexavalent chromium, which has a very low exposure limit in some countries. Manganese and nickel also have low exposure limits, in some countries, that may be easily exceeded.

Reasonably expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Air contaminants around the brazing and soldering area can be affected by the brazing and soldering process and influence the composition and quantity of fumes and gases produced.

11. TOXICOLOGICAL INFORMATION

Inhalation of brazing and soldering fumes and gases can be dangerous to your health. Classification of brazing and soldering fumes is difficult because of varying base materials, coatings, air contamination and processes. The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).

Acute toxicity: Overexposure to brazing and soldering fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes.

Chronic toxicity: Overexposure to brazing and soldering fumes may affect pulmonary function. Prolonged inhalation of nickel and chromium compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. Some individuals may develop blue-grey skin pigmentation from exposure to silver (argyria). Chronic exposure to fluorides above safe exposure levels can cause changes in bone density and the teeth (fluorosis). Overexposure to cadmium may cause cancer.

12. ECOLOGICAL INFORMATION

Brazing and soldering consumables and materials could degrade/weather into components originating from the consumables or from the materials used in the brazing and soldering process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater.

13. DISPOSAL CONSIDERATIONS

Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal and local regulations. Use recycling procedures if available.

USA RCRA: These products are not considered hazardous waste if discarded.

Residues from brazing and soldering consumables and processes could degrade and accumulate in soils and groundwater. Brazing and soldering slag from these products typically contain mainly the following components originating from the coating of the electrode: Ag, B, Cd, Cu, F, K, Ni, Sn and Zn.

14. TRANSPORT INFORMATION

No international regulations or restrictions are applicable.

15. REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when brazing and soldering and protect yourself and others.

WARNING: Brazing and soldering fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

ELECTRIC SHOCK can kill.

ARC RAYS and **SPARKS** can injure eyes and burn skin.

Wear correct hand, head, eye and body protection.

Canada: WHMIS classification: Class D; Division 1, Subdivision A
Class D; Division 2, Subdivision A

Canadian Environmental Protection Act (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

USA: Under the OSHA Hazard Communication Standard, these products are considered hazardous.

These products contain or produce a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code § 25249.5 et seq.)

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA Title III

Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	RQ (lb)	TPQ (lb)
Product is a solid solution in the form of a solid article.	--	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class

As shipped: Immediate In use: Immediate delayed

EPCRA/SARA Title III 313 Toxic Chemicals

The following metallic components are listed as SARA 313 "Toxic Chemicals" and potential subject to annual SARA 313 reporting. See Section 3 for weight percent.

Ingredient name	Disclosure threshold
Cadmium	0.1% de minimis concentration
Copper	1.0% de minimis concentration
Nickel	0.1% de minimis concentration
Silver	1.0% de minimis concentraton
Zinc (fume or dust)	1.0% de minimis concentraton

16. OTHER INFORMATION

This Safety Data Sheet has been revised due to modifications to Section 8. This SDS supersedes 37-L.

Refer to ESAB "Welding and Cutting - Risks and Measures", F52-529 "Precautions and Safe Practices for Electric Welding and Cutting" and F2035 "Precautions and Safe Practices for Gas Welding, Cutting and Heating" available from ESAB, and to:

- USA: Contact ESAB at www.esabna.com or 1-800-ESAB-123 if you have questions about this SDS.
 American National Standard Z49.1 "Safety in Welding and Cutting", ANSI/AWS F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWSF3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org.
 OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.
 American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.
 NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.
- UK: WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".
- Germany: Unfallverhütungsvorschrift BGV D1, "Schweißen, Schneiden und verwandte Verfahren".
- Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes".
 These products have been classified according to the hazard criteria of the CPR and the SDS contains all the information required by the CPR.

Explanation of risk phrases mentioned in this SDS:

- R-phrases: R15 – Contact with water liberates extremely flammable gases.
- R17 – Spontaneously flammable in air.
- R25 – Toxic if swallowed.
- R26 – Very toxic by inhalation.
- R34 – Causes burns.
- R40 – Limited evidence of a carcinogenic effect.
- R43 – May cause sensitization by skin contact.
- R45 – May cause cancer.
- R48/23 – Toxic: danger of serious damage to health by prolonged exposure through inhalation.
- R48/23/25 – Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.



- R50 – Very toxic to aquatic organisms.
- R53 – May cause long-term adverse effects in the aquatic environment.
- R60 – May impair fertility.
- R61 – May cause harm to the unborn child.
- R62 – Possible risk of impaired fertility.
- R63 – Possible risk of harm to the unborn child.
- R68 – Possible risk of irreversible effects.

ESAB requests the users of these products to study this Safety Data Sheet (SDS) and become aware of product hazards and safety information. To promote safe use of these products a user should:

- notify its employees, agents and contractors of the information on this SDS and any product hazards/safety information.
- furnish this same information to each of its customers for these products.
- request such customers to notify employees and customers for the same product hazards and safety information.

The information herein is given in good faith and based on technical data that ESAB believes to be reliable. Since the conditions of use are outside our control, we assume no liability in connection with any use of this information and no warranty, expressed or implied is given. Contact ESAB for more information.

SAFETY DATA SHEET
HOT-DIP GALVANIZED COATING

FILE NO.: 4158
SDS DATE: 5/10/2015

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Hot-Dip Galvanized Coating

SYNONYMS: Galvanized Steel, Galvanized Metal, Hot-Dipped Galvanized Steel
PRODUCT CODES: Not Applicable (NA)

MANUFACTURER: Metalplate Galvanizing, L.P.

ADDRESSES:

Metalplate Galvanizing, L.P. 4450 7 th Ave North Birmingham, Alabama 35212 205-595-1106	Metalplate Galvanizing, L.P. 1120 39 th Street, North Birmingham, Alabama 35234 205-595-7103
Metalplate Galvanizing, L.P. 505 Selig Drive, S.W. Atlanta, Georgia 30336 404-691-0600	Metalplate Galvanizing, L.P. 7123 Moncrief Road, West Jacksonville, Florida 32219 904-768-6330
Metalplate Galvanizing, L.P. 10625 Needham Street Houston, Texas 77013 713-671-2454	Metalplate Galvanizing, L.P. 10635 Needham Street Houston, Texas 77013 713-672-9480
Metalplate Galvanizing, L.P. 14055 Farm Supply Road Roanoke, Louisiana 70581 337-753-2285	

EMERGENCY PHONE:

205-595-1106 (AL)	205-595-7103 (AL)
404-691-0600 (GA)	904-768-6330 (FL)
713-671-2454 (TX)	713-672-9480 (TX)
337-753-2285 (LA)	

CHEMTREC PHONE: 800-424-9300
OTHER CALLS: 205-595-4703 (Technical Department)
FAX PHONE:

205-591-4659 (AL)	205-595-2965 (AL)
404-699-2270 (GA)	904-764-3948 (FL)
713-671-2957 (TX)	713-672-8992 (TX)
337-753-2261 (LA)	

CHEMICAL NAME: Zinc Metal
CHEMICAL FAMILY: Nonferrous Heavy Metal
CHEMICAL FORMULA: Zn

PRODUCT USE: Construction Products, Finished Goods Products, Finished Goods Components

PREPARED BY: Paul Finger Lynes, PE, CHMM

SECTION 2: HAZARDS IDENTIFICATION

CLASSIFICATION

Hot-Dip Galvanized Coatings are not classified as hazardous according to the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals. Constituents in the galvanized coating may represent a hazard if the material is heated, contacts incompatible materials such as acid or alkali, or changes form through cutting or grinding.

LABEL ELEMENTS

GHS label elements: Not Applicable

Hazard pictograms: Not Applicable

Signal Word: Not Applicable

Hazard Statement:

- Fumes, vapor, or dust may cause:
- Mild skin irritation
 - Eye irritation
 - Respiratory irritation

SAFETY DATA SHEET

HOT-DIP GALVANIZED COATING

FILE NO.: 4158
SDS DATE: 5/10/2015

SECTION 2: HAZARDS IDENTIFICATION (cont'd)

Precautionary Statement(s):

Prevention:

In the presence of fumes or dust:

- Wash hands thoroughly after handling
- Avoid breathing the dust or fumes without respiratory protection
- Do not eat, drink, or smoke
- Use in a well-ventilated area

Response:

IF ON SKIN: If skin irritation occurs. Wash with plenty of soap and water. Get medical advice/attention. Wash contaminated clothing before re-use or discard.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If Eye Irritation Persists: Get medical advice/attention

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.

A galvanized coating in its usual physical form does not present an inhalation, ingestion or contact hazard. However, operations such as welding, burning, or cutting may result in the above effects if exposures exceed recommended limits as listed in Section 8.

Disposal: Not Applicable

Storage: Exposure of the galvanized coating to precipitation can impact stormwater runoff.

Poisons Schedule (SUSMP): None allocated

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Composition of the galvanized coating:

Components	CAS Number	Proportion
Zinc	7440-66-6	93.9 – 96.0 %
Iron	7439-89-6	4.0 – 6.1 %
Bismuth	7440-69-9	0.0 – 0.07 %
Nickel	7440-02-0	0.0 – 0.0275 %
Lead	7439-92-1	0.0 – 0.02 %
Copper	7440-50-8	0.0 – 0.015 %
Aluminum	7429-90-5	0.0 – 0.0045 %
Cadmium	7440-43-9	0.0 – 0.0045 %
Tin	7440-31-5	0.0 – 0.0015 %
Chromium	7440-47-3	*

*After galvanizing, pieces are quenched in water containing sodium dichromate. A portion of the chromate coating applied to the surface of material does contain hexavalent chromium. After approximately three months of exposure, the hexavalent chromium typically decreases to non-detection levels. If cutting or welding takes place while chromate is potentially present, routine precautions for chromium exposure should be taken.

SECTION 4: FIRST AID MEASURES

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet. Symptoms or effects that may arise from exposure to fumes or dust are:

Inhalation: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if feeling unwell.

Eye Contact: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.

Skin Contact: If skin irritation occurs, immediately wash with soap and water. Seek medical advice/attention if irritation persists.

Ingestion: IF SWALLOWED: Rinse mouth. Do not induce vomiting and call a poison center or doctor/physician.

Notes to Physician: Treat symptomatically and supportively.

SAFETY DATA SHEET
HOT-DIP GALVANIZED COATING

FILE NO.: 4158
SDS DATE: 5/10/2015

SECTION 4: FIRST AID MEASURES (cont'd)

Short Term Effects:

Ingestion: Ingestion of harmful amounts of this product as distributed is unlikely due to its solid insoluble form. Ingestion of dust may cause nausea or vomiting.

Skin: Skin contact with dusts may cause irritation or sensitization, possibly leading to dermatitis. Skin contact with metallic fumes and dust may cause physical abrasion.

Eyes: Excessive exposure to high concentrations of dust may cause irritation to the eyes. Particles of iron or iron compounds, which become embedded in the eye, may cause rust stains unless removed fairly promptly.

Inhalation: Excessive exposure to high concentrations of dust may cause irritation to the eyes, skin and mucous membranes of the upper respiratory tract.

Short Term Effects by Component:

Zinc: Fumes of zinc are in the form of zinc oxide. Inhalation of high levels of zinc oxide may result in tightness of chest, metallic taste, cough, dizziness, fever, chills, headache, nausea, and dry throat. Overexposure may produce symptoms known as metal fume fever or "zinc shakes," an acute, self-limiting condition without recognized complications. Symptoms of metal fume fever include: chills, fever, muscular pain, nausea and vomiting. Like any finely divided particulate matter, zinc oxide may cause mechanical irritation to skin and eyes.

Iron: Iron is harmful if swallowed, and can cause skin and eye irritation. Contact with iron oxide has been reported to cause skin irritation and serious eye damage.

Bismuth: Bismuth is flammable in powder form. Exposure may cause irritation to the eyes and mucous membranes.

Nickel: Exposure to high concentrations of nickel may cause severe damage to the lungs and kidneys, gastrointestinal distress, nausea, vomiting, diarrhea, neurological effects, pulmonary fibrosis and renal edema.

Lead: Exposure to high concentrations of lead may lead to persistent fatigue, irritability, loss of appetite, stomach discomfort and/or constipation, reduced attention span and insomnia.

Copper: Copper in the form of salts may act as an irritant to the eyes and mucous membranes.

Aluminum: Dust may irritate throat and nose.

Cadmium: Exposure to high concentrations of cadmium may cause sore throat and nasal tissue, cough, and metallic taste followed by malaise, stiffness, muscular pain, and shortness of breath.

Tin: Exposure to high concentrations of tin may cause the following: eye and skin irritations, headaches, stomachaches, sickness and dizziness, severe sweating, breathlessness, and urination problems.

Chromium: Breathing high levels of hexavalent chromium can cause irritation or damage to the nose and throat. Symptoms may include runny nose, sneezing, coughing, itching and a burning sensation. Some persons can also develop an allergic skin reaction, called allergic contact dermatitis. This occurs from handling liquids or solid containing hexavalent chromium. Once a person become allergic, brief skin contact causes swelling and a red, itchy rash that becomes crusty and thickened with prolonged exposure. Direct skin contact can also cause non-allergic skin irritation. Contact with non-allergic skin can also lead to chrome ulcers. These are small-crusted skin sores with a rounded border. They heal slowly and leave scars.

Long Term Effects by Component:

Zinc: Chronic exposure to zinc may cause respiratory irritation with nasopharyngitis and laryngitis.

Iron: Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in the development of a benign pneumoconiosis, called siderosis, which is observable as an X-ray change. No physical impairment of lung function has been associated with siderosis. Inhalation of excessive concentrations of ferric oxide may enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

Bismuth: Bismuth is flammable in powder form. Exposure may cause irritation to the eyes and mucous membranes.

Nickel: Exposure to nickel containing dusts has been associated with coughing and shortness of breath. Chronic changes include increased susceptibility to pulmonary edema and interstitial fibrosis. Nickel metal and its alloys are considered to be of low toxicity for both acute and chronic ingestion exposure. Repeated or prolonged overexposure to metallic nickel can produce kidney damage.

Lead: Prolonged exposure to lead may produce many of the symptoms of short-term exposure, and may also cause central nervous system damage, gastrointestinal disturbances, anemia, and weight drop. Symptoms of central nervous damage include fatigue, headaches, tremors, hypertension, hallucinations, convulsions, and delirium. Kidney dysfunction and possible injury has also been associated with chronic lead poisoning. Chronic overexposure to lead has been implicated as a causative agent for the

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SECTION 4: FIRST AID MEASURES (cont'd)

impairment of male and female reproductive organs, but there is no present substantiation of this. Pregnant women should be protected from excessive exposure. Lead can cross the placental barrier and it is reported that infants with neurological disorders have been born to women who have experienced excessive exposure.

Copper: Long-term exposure to copper can cause irritation of the nose, mouth and eyes and it causes headaches, stomachaches, dizziness, vomiting and diarrhea. Intentionally high uptakes of copper may cause liver and kidney damage and even death. Industrial exposure to copper fumes, dusts, or mists may result in metal fume fever with atrophic changes in nasal mucous membranes. Chronic copper poisoning results in Wilson's disease, characterized by a hepatic cirrhosis, brain damage, demyelization, renal disease, and copper deposition in the cornea.

Aluminum: Long lasting uptakes of significant concentrations of aluminum can lead to serious health effects such as: damage to the central nervous system, dementia, loss of memory, listlessness, and severe trembling. Inhalation of finely divided aluminum and aluminum oxide powder has been reported as a cause of pulmonary fibrosis and lung damage.

Cadmium: The principal long-term effect of cadmium exposure involves the lungs, kidneys, and bones. The kidneys are the principal target organs of low-dose exposure. When the exposure is to newly generated cadmium fume, the lungs may be a primary target organ. Cadmium has also been postulated to adversely affect other organ systems such as the liver and cardiovascular system. In addition, there is evidence that cadmium exposure increases rates of lung carcinomas.

Tin: Chronic exposures to tin can cause the following: depression, liver damage, malfunctioning of immune systems, chromosomal damage, shortage of red blood cells, and brain damage (causing anger, sleeping disorders, forgetfulness and headaches).

Chromium: Chronic exposure can result in perforations and ulceration of the septum, bronchitis, decreased pulmonary function, pneumonia, asthma, and nasal itching and soreness.

SECTION 5: FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:

Not flammable or combustible. Use extinguishing measures that are appropriate for the surrounding fire.

Specific hazards arising from the substance or mixture:

Not applicable for solid product.

Special protective equipment and precautions for fire fighters:

Self-contained MSHA/NIOSH approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Heat and flames cause emittance of arid smoke and fumes. Do not release runoff from fire control methods to sewers or waterways. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream will scatter and spread flames and should not be used.

SECTION 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 SDS. Avoid generation and spreading of dust and fumes.

Environmental Precautions:

Follow applicable federal, state, and local regulations.

Methods and materials for containment and clean up:

For cleanup of material associated with dust or fumes, follow applicable OSHA regulations and all other pertinent state and federal requirements.

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling:

Avoid generation and spreading of dust. Do not breathe fumes or dust from this material. Avoid contact with sharp edges and hot surfaces. Use appropriate gloves and tools to ensure safe handling. Follow recommendations in ANSI Z49.1, Safety in welding and cutting. (ANSI = American National Standard Institute)

Conditions for safe storage, including any incompatibilities:

Whenever feasible store in a dry area. Store in a well-ventilated place. Store away from acids and incompatible materials.

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SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits:

Ingredients	OSHA PEL	ACGIH TLV	NIOSH REL	IDLH
Zinc	5 mg/m ³ (as zinc oxide fume) 15 mg/m ³ (as total dust) 5 mg/m ³ (as respirable fraction)	2.0 mg/m ³ (as zinc oxide)	10 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable dust)	None Established
Iron	10 mg/m ³ (as iron oxide fume)	5.0 mg/m ³ (as iron oxide dust and fume)	5.0 mg/m ³ (as iron oxide dust and fume)	2,500 mg Fe/m ³
Bismuth	15 mg/m ³ total TWA, 5 mg/m ³ resp	10 mg/m ³ TWA	10 mg/m ³ total TWA, 5 mg/m ³ resp	Not determined
Nickel	1 mg/m ³	1.5 mg/m ³	0.015 mg/m ³	1.5 mg/m ³ as Ni
Lead	0.05 mg/m ³	0.05 mg/m ³	0.05 mg/m ³	100 mg Pb/m ³
Copper	0.1 mg/m ³ (as copper fume)	0.2 mg/m ³ (as copper fume)	0.1 mg/m ³ (as copper fume)	200 mg Cu/m ³ (as copper fume)
Aluminum	15 mg/m ³ (as total dust, Particulates not Otherwise Regulated) 5.0 mg/m ³ (as respirable fraction, Particulates not Otherwise Regulated)	10 mg/m ³ (as metal dust) 5.0 mg/m ³ (as welding fume)	10 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable dust)	None Established
Cadmium	0.005 mg/m ³ (as total dust) 0.005 mg/m ³ (as respirable particulate)	0.01 mg/m ³ (as total dust) 0.002 mg/m ³ (as respirable particulate)	None Established	50 mg Cd/m ³ (as cadmium dust)
Tin	2 mg/m ³	2 mg/m ³	2 mg/m ³	400 mg Sn/m ³
Chromium (VI)	5 µg/m ³	10 µg/m ³	1 µg/m ³	250 mg Cr/m ³

Appropriate engineering controls

Use controls as appropriate to minimize exposure to metal fumes and dusts during handling operations. Provide general or local exhaust ventilation systems to minimize airborne concentrations. Local exhaust is necessary for use in enclosed or confined spaces. Provide sufficient general/local exhaust ventilation in pattern/volume to control inhalation exposures below current exposure limits.

Personal Protective Equipment (PPE)

Respiratory Protection: When dusts are generated and ventilation is not sufficient to effectively remove them, appropriate NIOSH approved respiratory protection must be provided if airborne concentrations exceed exposure limits.

Protective Clothing/Equipment

Eyes: Wear appropriate eye protection to prevent eye contact. For operations, which result in elevating the temperature of the product to or above its melting point or result in the generation of airborne particulates, use safety glasses to prevent eye contact.

Skin: Wear appropriate personal protective clothing to prevent skin contact. For operations, which result in elevating the temperature of the product to or above its melting point or result in the generation of airborne particulates, use protective clothing, and gloves to prevent skin contact. Protective gloves should be worn as required for burning or handling operations.

Other protective equipment: Use good industrial hygiene practices in handling this material. Eye wash fountain and emergency showers are recommended. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Silver luster to gray dull finish
Physical State:	Solid
Odor:	Odorless
Vapor Pressure:	Not Available
Odor Threshold:	Not Available
Vapor Density:	Not Available
pH:	Not Available
Specific Gravity:	7.1
Melting Point:	787°F (419°C)
Freezing Point:	Not Available
Solubility (ies):	Not Applicable
Boiling Point:	1665°F (907°C)
Flash Point:	Not Available
Evaporation Rate:	Not Available

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SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES (cont'd)

Flammability (solid, gas):	Not Available
Upper /Lower Flammability or Explosive Limits:	Not Available
Partition Coefficient: n-octanol/water:	Not Available
Auto-ignition Temperature:	Not Available
Decomposition Temperature:	Not Available
Viscosity:	Not Available

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Product as supplied is not reactive.

Chemical Stability: Stable under normal conditions of use and storage.

Possibility of Hazardous Reactions: No data available.

Conditions to Avoid: Storage with strong acids or calcium hypochlorite.

Incompatible Materials: Avoid contact with acids and alkalis.

Hazardous Decomposition Products: Zinc boils off as vapor at elevated temperatures (1665°F or 907°C).

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological Data:

The following toxicity data have been determined for Hot-Dip Galvanized Coatings using the information available for its components applied to the guidance on the preparation of an SDS under the requirements of the GHS.

No LC₅₀ or LD₅₀ has been established for Hot-Dip Galvanized Coatings. The following data has been determined for the components:

- Zinc: LD₅₀ = > 2000 mg/kg (Oral/Rat)
- Iron: LD₅₀ = 1060 mg/kg (Oral/Rat)
- Lead: LD₅₀ = 1200 µg/kg (Oral/Rat)
- Copper: LD₅₀ = > 1124 mg/kg (Dermal/Rat)
- Aluminum (as Aluminum Oxide): LD₅₀ = >5000 mg/kg (Oral/Rat)
- Cadmium: LD₅₀ = 2330 mg/kg (Oral/Rat)
- Tin: LD₅₀ not available

No Skin Irritation data available for Hot-Dip Galvanized Coatings as a solid. The following Skin Irritation information was found for the components:

- Iron: Causes skin irritation
- Copper: May irritate the skin

No Eye Irritation available for Hot-Dip Galvanized Coatings as a solid. The following Eye Irritation information was found for the components:

- Zinc: Causes serious eye irritation
- Iron: Irritation
- Copper: May irritate eyes

No Germ Cell Mutagenicity data available for Hot-Dip Galvanized Coatings as a solid. The following Germ Cell Mutagenicity information was found for the components:

- Iron: IUCLID has found some positive and negative findings *in vitro*.
- Aluminum and Aluminum Oxide: IUCLID; ATSDR have found this ingredient is not mutagenic *in vitro*; but has marginal effects *in vivo*
- Cadmium: *In vitro* tests showed mutagenic effects, Category 2

Carcinogenicity: IARC, NTP, and OSHA do not list Hot-Dip Galvanized Coatings as a solid. The following Carcinogenicity information was found for the components:

- Lead: Possible (Group 2B, IARC), Carcinogen (Animal, A3, ACGIH)
- Cadmium: Group1 carcinogen

No Toxic Reproduction data available for Hot-Dip Galvanized Coatings as a solid. The following Toxic Reproductive information was found for the components:

- Lead: Suspected human reproductive toxicant, Category 1A
- Aluminum and Aluminum Oxide: ATSDR has found these ingredients may cause delay in development of neurobehavioral indices
- Cadmium: Suspected human reproductive toxicant, Category 2

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SECTION 11: TOXICOLOGICAL INFORMATION (cont'd)

No Specific Target Organ Systemic Toxicity (STOST) following a Single Exposure data available for Hot-Dip Galvanized Coatings. The following STOST following a Single Exposure data was found for the components:

- Zinc: Listed as Category 3
- Iron: Listed as Category 3, Irritating to respiratory tract
- Copper: May cause respiratory irritation

No Specific Target Organ Systemic Toxicity (STOST) following Repeated Exposure data available for Hot-Dip Galvanized Coatings as a solid: The following STOST following Repeated Exposure Information was found for the components:

- Zinc and Zinc Oxide: EU RAR has found rats repeatedly exposed by oral route to Zn salts developed reduced copper levels and changes in the pancreas (focal acinar degeneration and necrosis) and the spleen (decreased number of pigmented macrophages)
- Lead: May cause damage to organs through prolonged or repeated exposure, Category 2
- Aluminum and Aluminum Oxide: IPCS INTOX listed as Category 2, review have found chronic exposure to aluminum flake has been reported to cause pneumoconiosis in workers. ASTDR listed as Category 2, has found repeat oral exposure to aluminum results in decrements in neurobehavioral function and development.
- Cadmium: Causes damage to organs through prolonged or repeated exposure, Category 1

No Aspiration Hazard data available for Hot-Dip Galvanized Coatings as a mixture or found for its components.

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

No data available for the product, Hot-Dip Galvanized Coatings as a solid. However, individual components of the product have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife as follows:

- Zinc and zinc oxide: LC₅₀ (96 hours) 1.2 ppm Category 1, very toxic to aquatic life with long lasting effects
- Iron (as iron oxide): LC₅₀: > 1000 mg/L; Fish
- Lead: LC₅₀ 2.2 mg/L, *Micropterus dolomieu*
- Copper: LOEC 0.022 mg/L – 96 hours, *Oncorhynchus mykiss* (rainbow trout)
- Aluminum (as aluminum oxide): LC₅₀ > 100 mg/L for fish and algae
- Cadmium: LC₅₀ 1.0 µg/L – 96 hours, *Pimephales promelas* (fathead minnow)

Persistence and Degradability

No Data Available

Bioaccumulative Potential

- Zinc (as Zinc Oxide): Bioconcentration factor (BCF): < 172-217
- Zinc Chloride: *Pimephales promelas* (fathead minnow) 53 days, Bioconcentration factor (BCF): 21
- Lead: *Oncorhynchus kisutch* – 2 weeks – 150 µg/L, Bioconcentration factor (BCF): 12
- Copper: *Cyprinus carpio* (Carp) – 40 days – 200 mg/L, Bioconcentration factor (BCF): 108
- Aluminum: *Salvelinus fontinalis* – 56 days – 268 µg/L, Bioconcentration factor (BCF): 36
- Cadmium: *Oncorhynchus mykiss* (rainbow trout) – 72 days – 1.27 µg/L, Bioconcentration factor (BCF): 55

Mobility in Soil

No Data Available

PBT and vPvB Assessment

No Data Available

Other Adverse Effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

SECTION 13: DISPOSAL CONSIDERATIONS

Hot-Dip Galvanized Coatings should be recycled whenever possible. Product dusts and fumes from processing operations should also be recycled, or classified by a competent environmental professional and disposed of in accordance with applicable federal, state, or local regulations.

SECTION 14: TRANSPORT INFORMATION

U.S. Department of Transportation (DOT) under 49 CFR 172 does not regulate Hot-Dip Galvanized Coatings as a hazardous material. All federal, state, and local laws and regulations that apply to this transport of this type of material must be adhered to.

Shipping Name: Not DOT Regulated
Shipping Symbols: NA
Hazard Class: NA

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SECTION 14: TRANSPORT INFORMATION (cont'd)

UN No: NA
Packing Group: NA
DOT/IMO Label: NA
Special Provisions (172.102): NA

The International Maritime Dangerous Goods (IMDG) and the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID) classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

ADR – Regulations Concerning the International Carriage of Dangerous Goods by Road does not regulate Hot-Dip Galvanized Coatings as a hazardous material.

Shipping Name: Not DOT Regulated
Classification Code: NA
UN No: NA
Packing Group: NA
ADR Label: NA
Special Provisions: NA
Limited Quantities: NA

IATA – International Air Transport Association (IATA) does not regulate Hot-Dip Galvanized Coatings as a hazardous material.

Shipping Name: Not DOT Regulated
Class/Division: NA
Hazard Label: NA
UN No: NA
Packing Group: NA
Excepted Quantities (EQ): NA

Transport Dangerous Goods (TDG) Classification: Hot-Dip Galvanized Coatings do not have a TDG classification.

SECTION 15: REGULATORY INFORMATION

U.S.

Ingredient listed on TSCA Inventory: Yes, Zinc and Lead
Hazardous Under Hazard Communication Standard: Yes (OSHA PELs for Tin and Aluminum)
CERCLA Section 103 Hazardous Substances:

Zinc: Reportable Quantity: 1,000 lb. (454 kg)*

*reporting not required when diameter of the pieces of solid metal released is equal to or exceeds 100 micrometers (0.004 inches)

EPCRA Section 302 Extremely Hazardous Substance: No
EPCRA Section 311/312 Hazard Categories: No Hazard Categories Apply
EPCRA Section 313 Toxic Release Inventory: Zinc (fume or dust) are reportable, Zinc Oxide (as zinc compound), Aluminum (fume or dust), Lead (10 lbs. (4.54 kg) reportable quantity), Cadmium

Canadian

Ingredients Listed on Domestic Substances List: Yes
WHMIS Classification: Not applicable. Zinc is not a controlled product under CPR.

European Union

Listed on the European Inventory of Existing Commercial Chemical Substances (EINECS): Yes
EU Classification: Not applicable. Zinc in ingot form is not listed as a dangerous substance. Aluminum and Tin are also not listed as a dangerous substance.

SECTION 16: OTHER INFORMATION

The information in this Safety Data Sheet is based on the following references:

- OSHA PELs (Permissible Exposure Limits) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted.
- Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. ACGIH TLVs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
- The National Institute for Occupational Safety and Health Recommended Exposure Limits (NIOSH – REL). NIOSH is the federal agency designated to conduct research relative to occupational safety and health. NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
- The "immediately dangerous to life or health air concentration values (IDLHs)" are used by NIOSH as part of the respirator selection criteria.

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SECTION 16: OTHER INFORMATION (cont'd)

- American Conference of Governmental Industrial Hygienists (ACGIH), 2013, *Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices*.
- Emergency Response Guidebook: A Guidebook for First Responders During the Initial Phase of a Dangerous Goods/Hazardous Materials Transportation Incident, 2012,
<http://phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/Hazmat/ERG2012.pdf>
- *Globally Harmonized System of Classification and Labeling Chemicals*, New York and Geneva: United Nations, 2007.
http://www.unece.org/trans/danger/publi/ghs/ghs_rev02/02files_e.html
- National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards, 2011,
<http://www.cdc.gov/niosh/npg/>

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USA - OSHA SAFETY DATA SHEET

Issue Date: 26-August-2015 Revision Date: / /

1. IDENTIFICATION

Product Name: Lead Products

Synonyms: Sheet lead, Strip lead, Lead plate, Lead flashings, Plumbing lead, Lead ingot, Lead pigs, Lead pipe, Lead bends, Lead wire, Came lead, Lead extrusions, Lead bricks, Lead wool, Lead anodes, Bullet lead, Lead bullets, Lead billets, Lead castings, Machined lead, Ballast lead, Other miscellaneous lead products. Powder-coated lead products and Painted lead products.

Recommended Uses: Roofing, non-potable plumbing, radiation shielding, ballast, nuclear shielding, etc.

Uses Advised Against: Jewelry, toys, potable plumbing

Manufacturer:
Ames Metal Products
2211 Foster ave
Wheeling, IL 60090
Ph: 847-749-1672

List Elements

DANGER



Hazard Statements

Lead - May cause cancer. May damage fertility or the unborn child. May cause harm to breastfed children. Cause damage to central nervous system, blood formation and kidneys and cardiovascular system through prolonged or repeated exposure.

Antimony - Dust or fume will be irritant. Antimony causes nasal septal ulceration and stomach lining irritation.

Appearance: Gray with bluish or silvery cast depending on alloy
Physical State: Solid
Odor: Odorless

2. HAZARDS IDENTIFICATION

Classification

This product is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Carcinogenicity	Category 1B
Reproductive toxicity	Category 1A
Specific target organ toxicity (repeated exposure)	Category 1

Precautionary Statements - Prevention

Obtain special instructions before use

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

Use personal protective equipment as required Wash face, hands and any exposed skin thoroughly after handling

Do not eat, drink or smoke when using this product

Use only outdoors or in a well-ventilated area Do not breathe dust/fume/gas/mist/vapors/spray

Precautionary Statements - Response

IF exposed or concerned: Get medical advice/attention

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell Rinse mouth

Precautionary Statements - Storage

Store locked up

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

Other information

Very toxic to aquatic life with long lasting effects

3. COMPOSITION/INFORMATION ON INGREDIENTS

Material	% by Wt.	CAS #	OSHA EXPOSURE LIMIT
Lead	90 - 99.99	7439-92-1	0.05 mg/cubic meter
Antimony	0 - 9	7440-36-0	0.50 mg/cubic meter
Tin	0 - 2	7440-31-5	2.00 mg/m ³

4. First Aid Measures

First Aid Measures

Eye Contact:	In case of eye contact, immediately flush eyes with fresh water for at least 15 minutes while holding the eyelids open. Remove contact lenses if worn. Get medical attention if irritation persists. Do not rub affected area.
Skin Contact:	Wash off immediately with soap and plenty of water. If skin irritation persists, call a Physician.
Inhalation:	Remove to fresh air. If breathing has stopped, give artificial respiration. Get medical Attention immediately. If conscious, have victim clear nasal passages.
Ingestion:	Seek immediate medical attention. Rinse mouth. Drink plenty of water. Induce Vomiting, but only if victim is fully conscious.

Most important symptoms and effects, both acute and delayed

Symptoms:	Acute (short term) exposure: Lead is a potent, systemic poison; taken in large enough Doses, lead can kill in a matter of days. Acute encephalopathy may arise which develops 3 Quickly to seizures, coma and death from cardiorespiratory arrest. Chronic (long term) exposure: Chronic overexposure to lead may result in severe damage To blood forming. Nervous, urinary and reproductive systems. Some common symptoms Of chronic overexposure include loss of appetite, metallic taste in mouth, anxiety, Constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, Nervous irritability, muscle and joint pain, fine tremors, numbness, dizziness, Hyperactivity, colic.
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Indication of any immediate medical attention and special treatment needed

Note to physicians: Treat symptomatically.

5. FIRE - FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, foam or CO2

Specific hazards arising from the chemical: May give off toxic fumes in a fire, including lead fumes.

Explosion data:

Sensitivity to Mechanical Impact: None known.

Sensitivity to Static Discharge: None known.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Lead is not considered to be a fire hazard. Powder/dust is flammable when heated or exposed to flame.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions:	Evaluate personnel to safe areas. Avoid contact with skin, eyes and inhalation of dusts. Use personal protection recommended in Section 8.
For emergency responders:	Wear respiratory protection. Wear proper personal protective equipment (gloves and goggles). Wear appropriate outer garment to protect clothing.

Environmental precautions

Environmental precautions: Prevent entry into waterways, sewers, surface drainage systems and poorly ventilated areas.

Methods and material for containment and cleaning up

Methods for containment: Avoid creating dust. Safely stop source of spill. Restrict non-essential personnel from area. All personnel involved in spill cleanup should avoid skin and eye contact by wearing appropriate personal protection equipment. Do not breathe dust.

Methods for cleaning up: Avoid dust formation. Clean up dusts with high efficiency particulate air (HEPA) filtered vacuum equipment or by wet cleaning.

Prevention of secondary hazards: Clean contaminated objects and area thoroughly observing environmental regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling: Use personal protection recommended in Section 8. Avoid generation of dust. Be familiar with the requirements set forth in the OSHA Lead Standard, 29 CFR 1910.1025.

Conditions for safe storage, including any incompatibilities

Storage Conditions: Keep containers tightly closed in a dry, cool and well-ventilated place.

Incompatible materials: Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Lead 7439-92-1	TWA: 0.15 mg/m ³ Pb	TWA: 0.05 mg/m ³ Pb	IDLH: 100 mg/m ³ Pb TWA: 0.050 mg/m ³ Pb
Antimony 7440-36-0	TWA: 0.5 mg/m ³ Sb	TWA: 0.5 mg/m ³ Sb	IDLH: 0.50 mg/m ³ Sb TWA: 0.5 mg/m ³ Sb
Tin 7440-31-5	TWA: 2.0 mg/m ³ Sn	TWA: 2.0 mg/m ³ Sn	IDLH: 100 mg/m ³ Sn TWA: 2.0 mg/m ³ Sn

Appropriate engineering controls

Engineering Controls: Use contained process enclosures, local exhaust ventilation or other engineering controls to maintain aerosols below the exposure limit. If user operations generate dust, fume or mist use ventilation to keep exposure to airborne contaminants below the exposure limit.

Individual protection measures, such as personal protective equipment

Eye/face protection: Use safety glasses with side shields or chemical goggles

Skin and body protection: Protective clothing is required if exposure exceeds the PEL or TLV or where possibility of skin or eye irritation exists. Full body cotton or disposable coveralls and disposable

gloves should be worn during use and handling. Clothing should be left at work site and be properly disposed of or laundered after use. The wash water should be disposed of in accordance with local, state and federal regulations. Personal clothing should be protected from contamination.

Respiratory protection: If engineering controls cannot maintain airborne concentrations below exposure limits, use appropriate, approved respiratory protection (a 42 CFR 84 class N, R, or P-100 particulate filter cartridge). When exposure levels are unknown, a self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask should be worn. Utilization of respiratory equipment should be in accordance with 29 CFR 1910.1025 and 29 CFR 1910.134

General Hygiene Considerations: Do not eat, drink or smoke when using this product. Contaminated work clothing should not be allowed out of the workplace. Wear disposable gloves and eye/face protection. Wash face, hands and any exposed skin thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state: Solid
Appearance: Gray with bluish or silvery cast depending on alloy
Odor: Odorless

<u>Property</u>	<u>Values</u>	<u>rks *Method</u>
pH:	Not available	
Melting point/freezing point:	>600°C	
Boiling point/boiling range:	>600°C	
Flash Point:	Not applicable (high-melting point solid)	
Evaporation rate:	Not applicable (high-melting point solid)	
Flammability (solid, gas) :	Not combustible	
Flammability Limit in Air		
Upper flammability limit:	Not combustible	
Lower flammability limit:	Not combustible	
Vapor pressure:	Negligible	
Vapor density:	Not applicable (high-melting point solid)	
Specific Gravity:	9.96	
Water solubility:	70.2 mg/L at 20°C	
Solubility in other solvents:	Lead compounds, soluble in 0.07 M hydrochloric acid	
Partition coefficient:	Not applicable (inorganic)	

Auto ignition temperature:	Not combustible
Decomposition temperature:	>600°C
Dynamic viscosity:	Not applicable (solid)
Explosive properties:	Not considered to be explosive
Oxidizing properties:	Not considered to be oxidizing
<u>Other information</u>	
Softening point:	Not available
Molecular weight:	Not available
VOC Content (%):	Not available
Bulk density:	Not available

10. STABILITY AND REACTIVITY

Reactivity

Stable under normal conditions.

Chemical stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None under normal processing.

Hazardous polymerization does not occur.

Conditions to avoid

Avoid excessive exposure to heat.

Incompatible materials

Strong oxidizing agents.

Hazardous Decomposition Products

Lead oxide fumes.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Hazardous exposure to lead compounds can occur only when product is heated, oxidized or otherwise processed or damaged to create dust, vapor or fume.

Inhalation:	Inhalation of lead dust or fumes may cause irritation of upper respiratory tract and lungs
Eye contact:	Lead compounds may cause eye irritation
Skin contact:	Lead compounds are poorly absorbed through the skin
Ingestion:	Acute ingestion of lead compounds may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping. This may lead to rapidly systemic toxicity and must be treated by a physician.

Component information:

Lead is slowly absorbed by ingestion and inhalation and poorly absorbed through the skin. If absorbed, lead will accumulate in the body with low rates of excretion, leading to long-term build up. Part of risk management is to take blood samples from workers for analysis to ensure that exposure levels are acceptable.

<u>Chemical Name</u>	<u>Oral LD50</u>	<u>Dermal LD50</u>	<u>Inhalation LC50</u>
Lead 7439-92-1	56 mg/m ³ Rat	Not available	100 mg/m ³ Rat
Antimony 7440-36-0	7500mg Sb/kg Rat	Not available	720 mg Cu/m ³ Rat
Tin 7440-31-5	2207mg Sn/kg Rat	Not available	Not available

Information on toxicological effects**Symptoms:**

Not available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure**Skin corrosion/irritation:**

Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation.

Serious eye damage/eye irritation:

Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation.

Inhalation:

In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungs by mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually absorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust or inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, and irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, delirium, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flulike symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count.

Ingestion:

Lead metal granules or dust: The Symptoms of lead poisoning include abdominal pain or cramps (lead colic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute

poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Carcinogenic effects:

Epidemiology studies of workers exposed to inorganic lead compounds have found a limited association with stomach cancer. This has led to the classification by IARC that inorganic lead compounds are probably carcinogenic to humans

<u>Chemical Name</u>	<u>ACGIH</u>	<u>IARC</u>	<u>NTP</u>	<u>OSHA</u>
Lead 7439-92-1	A3	2B	Reasonably Anticipated	Category 1B
Antimony 7440-36-0	A2	2B	Not Listed	Category 2
Tin 7440-31-5	Not Listed	Not Listed	Not Listed	Not Listed

Reproductive toxicity:

Exposure to high levels of lead may cause adverse effects on male and female, including adverse effects on sperm quality. Prenatal exposure to lead and its compounds is also associated with adverse effects on fetal development.

STOT - single exposure:

Lead has been found to be of relatively low acute toxicity by ingestion, in contact with skin, and by inhalation, with no evidence of any local or systemic toxicity from such exposures.

STOT - repeated exposure:

Lead is a cumulative poison and may be absorbed into the body through ingestion or inhalation. Inorganic lead compounds have been documented in observational human studies to produce toxicity in multiple organ systems and body function including the hematopoietic (blood) system, kidney function, reproductive function and the central nervous system. Postnatal exposure to lead compounds is associated with impacts on neurobehavioral development in children.

Chronic toxicity:

Lead is a cumulative poison. Increasing amounts of lead can build up in the body and may reach a point where symptoms and disabilities occur. Continuous exposure may result in decreased fertility. Lead is a teratogen. Overexposure of lead by either parent before pregnancy may increase the chances of miscarriage or birth defects. May cause cancer. Contains a known or suspected reproductive toxin. May cause adverse kidney effects.

Target Organ Effects:

Lead is a cumulative poison and may be absorbed into the body through ingestion or inhalation. Inorganic lead compounds have been documented in observational human studies to produce toxicity in multiple organ systems and body function including the hematopoietic (blood) system, kidney function, reproductive function and the central nervous system. Postnatal exposure to lead compounds is associated with impacts on neurobehavioral development in children.

Aspiration hazard:

Not available.

Numerical measures of toxicity - Product Information

The following values are calculated based on chapter 3.1 of the GHS document.

Inhalation LC50:

Soluble lead compounds are listed as a marine pollution according to DOT.

12. ECOLOGICAL INFORMATION

Environmental Fate

Lead is very persistent in soil and sediments. No data on environmental degradation. Mobility of metallic lead between ecological compartments is slow. Bioaccumulation of lead occurs in aquatic and terrestrial animals and plants, but little bioaccumulation occurs through the food chain. Most studies include lead compounds and not elemental lead.

Environmental Toxicity

Soluble lead compounds are listed as a marine pollution according to DOT.

<u>Chemical Name</u>	<u>Algae/aquatic plants</u>	<u>Fish</u>	<u>Toxicity to microorganisms</u>	<u>Crustacean</u>
Lead 7439-92-1	0.072-0.388: 72h Pseudokirchneriella subcapitata, Chlorella kessierii mg/L ErC50 (pH 5.5-6.5) 0.026-0.080: 72h Pseudokirchneriella subcapitata, Chlorella kessierii mg/L ErC50 (pH >6.5-7.5) 0.021-0.050: 72h Pseudokirchneriella subcapitata, Chlorella kessierii mg/L ErC50 (pH <7.5-8.5)	0.298: 96h Pimephales promelas mg/L LC50 static 0.041-1.810: 96h Pimephales promelas, Oncorhynchus mykiss mg/L LC50 (pH 5.5-6.5) 0.052-3.60: 96h Pimephales promelas, Oncorhynchus mykiss mg/L LC50 (pH >6.5-7.5) 0.114-3.25: 96h Pimephales promelas, Oncorhynchus mykiss mg/L LC50 (pH >7.5-8.5) 56000: 96h Gambusia affinis mg/L LC50 static		0.074-0.656: 48h Daphnia magna, Ceriodaphnia dubia mg/L LC50 (pH 5.5-6.5) 0.029-1.18: 48h Daphnia magna, Ceriodaphnia dubia mg/L LC50 (pH >6.5-7.5) 0.026-3.12: 48h Daphnia magna, Ceriodaphnia dubia mg/L LC50 (pH >7.5-8.5)
Antimony 7440-36-0	None listed	Cyprinodont variegates: LC50 = 6.2-8.3 mg/L/96h	None listed	None listed
Tin 7440-31-5	None listed	None listed	None listed	None listed

Bioaccumulation

While lead metal and its compounds are generally insoluble, its processing or extended exposure in aquatic and terrestrial environments may lead to the release of lead in bioavailable forms. Lead compounds are not particularly mobile in the aquatic environments, but can be toxic for organisms, especially fish, at low concentrations. Water hardness, pH and dissolved organic carbon content are factors which regulate the degree of toxicity. In soil, lead compounds are generally not very bioavailable.

Mobility

Lead and lead compounds will partially settle out due to their fairly low solubility and partially dissolve. In soil, lead and lead compounds are generally not very mobile or bioavailable, as they can be strongly absorbed on soil particles, increasingly over time. It also forms complexes with organic matter and clay minerals that limit its mobility. When released into the soil, this material is not expected to leach into groundwater.

Other adverse effects

Not available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes:	Disposal should be in accordance with applicable regional, national and local laws and regulations.
Contaminated packaging:	Disposal should be in accordance with applicable regional, national and local laws and regulations.

14. TRANSPORT INFORMATION

Note: This product is not regulated for domestic transport by land, air or rail.

Under 49 CFR 171.8, individual packages that contain lead metal (<100 micrometers) below the reportable quantity (RQ) are not regulated.

Under 49 CFR 171.4, except when transporting aboard a vessel, the requirements of this subchapter specific to marine pollutants do not apply to non-bulk packaging transported by motor vehicles, rail cars and aircrafts.

<u>DOT</u>	
Proper shipping name	Not applicable
Hazard Class	Not applicable
Packing Group	Not applicable
Reportable Quantity (RQ)	Not applicable
Marine pollutant	Soluble lead compounds are listed as a marine pollutant according to DOT.
Emergency Response Guide	Not applicable

15. REGULATORY INFORMATION

International Inventories:

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA	United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL	Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS	European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS	Japan Existing and New Chemical Substances
IECSC	China Inventory of Existing Chemical Substances
KECL	Korean Existing and Evaluated Chemical Substances
PICCS	Philippines Inventory of Chemicals and Chemical Substances
AICS	Philippines Inventory of Chemicals and Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the

Code of Federal Regulations, Part 372.

<u>Chemical Name</u>	<u>CAS No.</u>	<u>Weight - %</u>	<u>SARA 313 - Threshold Values %</u>
Lead	7439-92-1	90 - 99.99	0.1
Antimony	7440-36-0	0 - 9	1.0
Tin	7440-31-5	0 - 2	Not Listed

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

<u>Chemical Name</u>	<u>CWA - Reportable Quantities</u>	<u>CWA - Reportable Quantities</u>	<u>CWA - Priority Pollutants</u>	<u>CWA - Hazardous Substances</u>
Lead 7439-92-1	10 lb.	X	X	X
Antimony 7440-36-0	5000 lb.	X	X	X
Tin 7440-31-5	-	-	-	-

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302).

US State Regulations

California Proposition 65

This product contains a chemical known to the state of California to cause birth defects or other reproductive harm.

<u>Chemical Name</u>	<u>California Proposition 65</u>
Lead - 7439-92-1	Cancer
Antimony - 7440-36-0	Cancer
Tin - 7440-31-5	Not Listed

US State Right-to-Know Regulations

<u>Chemical Name</u>	<u>New Jersey</u>	<u>Massachusetts</u>	<u>Pennsylvania</u>
Lead - 7439-92-1	X	X	X
Antimony - 7440-36-0	X	X	X
Tin - 7440-31-5	X	-	X

US EPA Label Information

EPA Pesticide Registration Number Not available

16. OTHER INFORMATION

Issue Date 26-August-2015
Revision Date
Revision Note None

Disclaimer

This information provided in this Safety Data Sheet is correct to the best of our knowledge, information and Belief at the date of its publication. The information given is designed only as guidance for safe handling, use, Processing, storage, transportation, disposal and release and is not to be considered a warranty or quality Specification. The information materials or in any process, unless specified in the text.

Safety Data Sheet

acc. to OSHA HCS (29 CFR 1910.1200)


Printing date 07/01/2015

Reviewed on 07/01/2015

1 Identification

- **Product identifier**
- **Trade name: Nickel Based Alloy Steel, No 2200 Series**
- **Other Product Identifiers:** Nickel 2XX, Monel Alloy 4XX, Inconel Alloy 6XX & 7XX, Inconel Alloy 8XX
- **Recommended use and restriction on use**
- **Recommended use:** Raw materials.
- **Restrictions on use:** Contact manufacturer.
- **Details of the supplier of the Safety Data Sheet**
- **Manufacturer/Supplier:**
Castle Metals
1420 Kensington Road Suite 220
Oak Brook IL 60523
(847) 349-3000
- **Emergency telephone number:** (847)-349-3000

2 Hazard(s) identification

- **Classification of the substance or mixture**
The product is not classified as hazardous according to the Globally Harmonized System (GHS).
- **Additional information:**
There are no other hazards not otherwise classified that have been identified.
0 percent of the mixture consists of ingredient(s) of unknown toxicity.
Not hazardous as delivered. Long term inhalation of product dusts formed during use is harmful.
- **Label elements**
- **GHS label elements**
The product is not classified as hazardous according to OSHA GHS regulations within the United States.
- **Hazard pictograms** Not Regulated
- **Signal word** Not Regulated
- **Hazard-determining components of labeling:** None.
- **Hazard statements** Not Regulated
- **Precautionary statements** Not Regulated
- **Hazard description:**
- **WHMIS-symbols:** Not hazardous under WHMIS.
- **Classification system:**
- **NFPA ratings (scale 0 - 4)**
 Health = 0
Fire = 0
Reactivity = 0
- **HMIS-ratings (scale 0 - 4)**

HEALTH	0
FIRE	0
REACTIVITY	0

 Health = 0
Fire = 0
Reactivity = 0
- **Other hazards**
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.

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· vPvB: Not applicable.

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3 Composition/information on ingredients

- **Chemical characterization: Mixtures**
- **Description:** Mixture of the substances listed below with nonhazardous additions.

- **Dangerous components:**

7440-02-0	nickel ⚠ Carc. 2, H351; STOT RE 1, H372 ⚠ Skin Sens. 1, H317	95-99%
7439-96-5	manganese, powdered ⚠ Flam. Sol. 1, H228	<5%
7440-33-7	tungsten	<5%
7440-32-6	titanium ⚠ Self-heat. 1, H251; Water-react. 1, H260	<5%
7440-47-3	chromium	<2%

- **Additional information:**
 For the listed ingredients, the identity and exact percentages are being withheld as a trade secret.

4 First-aid measures

- **Description of first aid measures**
- **General information:** No special measures required.
- **After inhalation:** Supply fresh air; consult doctor in case of complaints.
- **After skin contact:**
 Brush off loose particles from skin.
 Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:**
 Remove contact lenses if worn, if possible.
 Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
- **After swallowing:**
 Rinse out mouth and then drink plenty of water.
 Do not induce vomiting; immediately call for medical help.
- **Information for doctor:**
- **Most important symptoms and effects, both acute and delayed**
 No further relevant information available.
- **Danger** No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed**
 No further relevant information available.

5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**
 Special powder for metal fires. Do not use water.

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Trade name: Nickel Based Alloy Steel, No 2200 Series

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- Dry sand
- Graphite powder.
- Dry sodium chloride
- **For safety reasons unsuitable extinguishing agents:** Water
- **Special hazards arising from the substance or mixture**
Formation of toxic gases is possible during heating or in case of fire.
- **Advice for firefighters**
- **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.
- **Additional information** No further relevant information available.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
Ensure adequate ventilation.
Do not breathe dust.
Avoid formation of dust.
Use personal protective equipment as required.
For large spills, use respiratory protective device against the effects of fumes/dust/aerosol.
- **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
- **Methods and material for containment and cleaning up:**
Pick up mechanically.
Dispose of the collected material according to regulations.
Send for recovery or disposal in suitable receptacles.
- **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
Prevent formation of dust.
Any deposit of dust which cannot be avoided must be regularly removed.
Use proper precautions around molten material.
- **Information about protection against explosions and fires:**
Keep respiratory protective device available.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:** No special requirements.
- **Information about storage in one common storage facility:**
Store away from foodstuffs.
Do not store together with acids.
Do not store together with alkalis (caustic solutions).
Store away from oxidizing agents.

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- **Further information about storage conditions:** None.
- **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

- **Additional information about design of technical systems:** No further data; see item 7.
- **Control parameters**

· Components with limit values that require monitoring at the workplace:

7440-02-0 nickel

PEL (USA)	Long-term value: 1 mg/m ³
REL (USA)	Long-term value: 0.015 mg/m ³ as Ni; See Pocket Guide App. A
TLV (USA)	Long-term value: 1.5* mg/m ³ elemental, *inhalable fraction
EL (Canada)	Long-term value: 0.05 mg/m ³ ACGIH A1, IARC 2B
EV (Canada)	Long-term value: 1 mg/m ³ Inhalable fraction
LMPE (Mexico)	Long-term value: 1.5* mg/m ³ *elemental:A5, fracción inhalable

7439-96-5 manganese, powdered

PEL (USA)	Ceiling limit value: 5 mg/m ³ as Mn
REL (USA)	Short-term value: 3 mg/m ³ Long-term value: 1 mg/m ³ fume, as Mn
TLV (USA)	Long-term value: 0.02* 0.1* mg/m ³ as Mn; *respirable **inhalable fraction
EL (Canada)	Long-term value: 0.2 mg/m ³ as Mn; R
EV (Canada)	Long-term value: 0.2 mg/m ³ as manganese
LMPE (Mexico)	Long-term value: 0.2 mg/m ³ como Mn

7440-33-7 tungsten

PEL (USA)	and insoluble compounds, as We
REL (USA)	Short-term value: 10 mg/m ³ Long-term value: 5 mg/m ³ as W
TLV (USA)	Short-term value: 10 mg/m ³ Long-term value: 5 mg/m ³ as W

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Trade name: Nickel Based Alloy Steel, No 2200 Series

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EL (Canada)	Short-term value: 10 mg/m ³ Long-term value: 5 mg/m ³ as W
EV (Canada)	Short-term value: 10* 3** mg/m ³ Long-term value: 5* 1** mg/m ³ (as tungsten; compds.:*water-insol.;**water-sol.
LMPE (Mexico)	Short-term value: 10 mg/m ³ Long-term value: 5 mg/m ³ como W

7440-47-3 chromium

PEL (USA)	Long-term value: 1* 0.5** mg/m ³ *metal;**inorganic compds., as Cr
REL (USA)	Long-term value: 0.5* mg/m ³ *metal+inorg.compds.as Cr;See Pocket Guide App. C
TLV (USA)	Long-term value: 0.5 mg/m ³
EL (Canada)	Long-term value: 0.5 mg/m ³ as metal
EV (Canada)	Long-term value: 0.05 mg/m ³
LMPE (Mexico)	Long-term value: 0.5 mg/m ³ A4

- **Additional information:** No further relevant information available.
- **Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Store protective clothing separately.
Wash hands before breaks and at the end of work.
Avoid close or long term contact with the skin.
- **Engineering controls:** No further relevant information available.
- **Breathing equipment:**
Particulate mask should filter at least 99% of airborne particles.
Use respiratory protection when grinding or cutting material.
- **Protection of hands:**
Wear gloves for the protection against mechanical hazards according to OSHA and NIOSH rules.
- **Eye protection:**


Safety glasses

- **Body protection:** Protective work clothing
- **Limitation and supervision of exposure into the environment** Avoid release to the environment.
- **Risk management measures** See Section 7 for additional information.

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Trade name: Nickel Based Alloy Steel, No 2200 Series

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9 Physical and chemical properties

Information on basic physical and chemical properties**General Information****Appearance:**

Form:	Solid material
Color:	Copper colored
Odor:	Odorless
Odor threshold:	Not determined.

pH-value: Not applicable.**Change in condition**

Melting point/Melting range:	982 °C (1800 °F)
Boiling point/Boiling range:	Undetermined.

Flash point: Not applicable.**Flammability (solid, gaseous):** Not determined.**Auto-ignition temperature:** Not determined.**Decomposition temperature:** Not determined.**Auto igniting:** Product is not self-igniting.**Danger of explosion:** Product does not present an explosion hazard.**Explosion limits:**

Lower:	Not determined.
Upper:	Not determined.

Vapor pressure: Not applicable.**Density at 20 °C (68 °F):** 8 g/cm³ (66.76 lbs/gal)**Relative density** Not determined.**Vapour density** Not applicable.**Evaporation rate** Not applicable.**Solubility in / Miscibility with****Water:** Insoluble.**Partition coefficient (n-octanol/water):** Not determined.**Viscosity:****Dynamic:** Not applicable.**Kinematic:** Not applicable.**Other information** No further relevant information available.

10 Stability and reactivity

Reactivity**Chemical stability****Thermal decomposition / conditions to be avoided:** Heating may cause release of toxic fumes.

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Trade name: Nickel Based Alloy Steel, No 2200 Series

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- **Possibility of hazardous reactions**
 Reacts with strong acids and alkali.
 Reacts with strong oxidizing agents.
 Reacts with halogenated compounds.
 As the product is supplied it is not capable of dust explosion; however enrichment with fine dust causes risk of dust explosion.
- **Conditions to avoid** Avoid acids.
- **Incompatible materials:** Oxidizers, strong bases, strong acids
- **Hazardous decomposition products:**
 Possible in traces:
 Toxic metal oxide smoke
 Leadoxide vapor

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

- **LD/LC50 values that are relevant for classification:**

7439-96-5 manganese, powdered

Oral	LD50	9000 mg/kg (rat)
------	------	------------------

- **Primary irritant effect:**
- **on the skin:** No irritant effect.
- **on the eye:** No irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
 The product is not subject to classification according to internally approved calculation methods for preparations:
 When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.

- **Carcinogenic categories**

- **NTP (National Toxicology Program)**

7440-02-0	nickel	R
-----------	--------	---

- **OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients is listed.

- **Probable Routes of Exposure**

 Inhalation.
 Eye contact.
 Skin contact.

- **Repeated Dose Toxicity:**

 May cause metal fume disease.
 Repeated or long-term inhalation of product dusts may cause pulmonary disease.

- **CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction):**

- **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
- **Carcinogenicity** Based on available data, the classification criteria are not met.
- **Reproductive toxicity** Based on available data, the classification criteria are not met.
- **STOT-single exposure** Based on available data, the classification criteria are not met.

(Contd. on page 8)

Safety Data Sheet

acc. to OSHA HCS (29 CFR 1910.1200)

Printing date 07/01/2015

Reviewed on 07/01/2015

Trade name: Nickel Based Alloy Steel, No 2200 Series

(Contd. of page 7)

- **STOT-repeated exposure** Based on available data, the classification criteria are not met.
- **Aspiration hazard** Based on available data, the classification criteria are not met.

12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential** May be accumulated in organism
- **Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:**
The product contains heavy metals. Avoid transfer into the environment. Specific preliminary treatments are necessary.
- **Other adverse effects** No further relevant information available.

13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**
Contact manufacturer for recycling information.
The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

- | | |
|---------------------------------------|-----------------|
| · UN-Number | |
| · DOT, ADR, ADN, IMDG, IATA | Not Regulated |
| · UN proper shipping name | |
| · DOT, ADR, ADN, IMDG, IATA | Not Regulated |
| · Transport hazard class(es) | |
| · DOT, ADR, IMDG, IATA | |
| · Class | Not Regulated |
| · Label | - |
| · ADN/R Class: | Not Regulated |
| · Packing group | |
| · DOT, ADR, IMDG, IATA | Not Regulated |
| · Environmental hazards: | |
| · Marine pollutant: | No |
| · Special precautions for user | Not applicable. |

(Contd. on page 9)

Safety Data Sheet

acc. to OSHA HCS (29 CFR 1910.1200)

Printing date 07/01/2015

Reviewed on 07/01/2015

Trade name: Nickel Based Alloy Steel, No 2200 Series

(Contd. of page 8)

- **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.
- **UN "Model Regulation":** -

15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **United States (USA)**
- **SARA**

- **Section 355 (extremely hazardous substances):**

None of the ingredients is listed.

- **Section 313 (Specific toxic chemical listings):**

7440-02-0 | nickel

7439-96-5 | manganese, powdered

- **TSCA (Toxic Substances Control Act):**

All ingredients are listed.

- **Proposition 65 (California)**

- **Chemicals known to cause cancer:**

7440-02-0 | nickel

- **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients are listed.

- **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients is listed.

- **Chemicals known to cause developmental toxicity:**

None of the ingredients is listed.

- **Carcinogenic categories**

- **EPA (Environmental Protection Agency)**

7439-96-5 | manganese, powdered

D

7440-47-3 | chromium

D

- **IARC (International Agency for Research on Cancer)**

7440-02-0 | nickel

1

7440-47-3 | chromium

3

- **TLV (Threshold Limit Value established by ACGIH)**

7440-02-0 | nickel

A5

7440-47-3 | chromium

A4

- **NIOSH-Ca (National Institute for Occupational Safety and Health)**

7440-02-0 | nickel

- **State Right to Know Listings**

None of the ingredients is listed.

(Contd. on page 10)

Safety Data Sheet

acc. to OSHA HCS (29 CFR 1910.1200)

Printing date 07/01/2015

Reviewed on 07/01/2015

Trade name: Nickel Based Alloy Steel, No 2200 Series

(Contd. of page 9)

• Canadian substance listings:
• Canadian Domestic Substances List (DSL)

All ingredients are listed.

• Canadian Ingredient Disclosure list (limit 0.1%)

7440-02-0 nickel

7440-47-3 chromium

• Canadian Ingredient Disclosure list (limit 1%)

7439-96-5 manganese, powdered

7440-33-7 tungsten

• Other regulations, limitations and prohibitive regulations

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

• **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

• **Date of preparation / last revision** 07/01/2015 / -

• Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

Flam. Sol. 1: Flammable solids, Hazard Category 1

Self-heat. 1: Self-Heating Substances and Mixtures, Hazard Category 1

Water-react. 1: Substances and Mixtures which, in contact with water, emit flammable gases, Hazard Category 1

Skin Sens. 1: Sensitisation - Skin, Hazard Category 1

Carc. 2: Carcinogenicity, Hazard Category 2

STOT RE 1: Specific target organ toxicity - Repeated exposure, Hazard Category 1

• Sources

SDS Prepared by:

ChemTel Inc.

1305 North Florida Avenue

Tampa, Florida USA 33602-2902

Toll Free North America 1-888-255-3924 Intl. +01 813-248-0573

Website: www.chemtelinc.com



SAFETY DATA SHEET

Issue Date 28-May-2015

Revision Date 27-May-2016

Version 4

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Name Stainless Steel

Other means of identification

Product Code

FRP008

Synonyms

Stainless Steel: ATI 20™, ATI 20-20+Nb™, ATI 201™, ATI 219™, 21-6-9, AL40, XM-11, ATI 301™, ATI 302™, ATI 303™, ATI 304™, ATI 305™, ATI 309™, ATI 310™, ATI 316™, ATI 317™, ATI 321™, ATI 255™ DUPLEX, ATI 332™, ATI 334™, ATI 347™, ATI 348™, AM 350®, AM 355™, ATI 403™, ATI Ohmaloy® 30, ATI Ohmaloy® 40, ATI Ohmaloy®, ATI 409 HP™, ATI 409 Cb™, ATI 410™, ATI 412™, Type 415, ATI 416™, ATI 420™, ATI 430™, ATI 433™, Type 434, Type 436, ATI 439™, ATI 439 HP™, XM-8, Type 441, 18-0, AL 18CrCb, ATI 441 HP™, ATI 444™, 18-2, ATI 468™, ATI 15-5™, ATI 17-4™, ATI 17-7™, ATI 15-7™, ATI JS700® ALLOY, ATI 800™ ALLOY, ATI 825™ ALLOY, Type 840, ATI E-BRITE® 26-1, ASTM XM 27, ATI 2205™ DUPLEX; 318, ATI 2205™ DUPLEX; 322, ATI 201LN™, Type 301L, ATI 304 DA™, Type 304H, ATI 304L™, 374L, Type 304LN, Type 304N, Type 309H, ATI 309S™, 398, Type 309Si, Type 310Cb, Type 310H, Type 310L, ATI 310S™, Type 310Si, ATI 316L™, 376, ATI 316LN™, ATI 316Ti™, ATI 317L™, ATI 317LMN™, 317 LX, 317 LXN, 317 XN, Type 321H, Type 410 MOD, Type 410HC, ATI 410S™, ATI 418 SPL™, Type 420HC, ALLEGHENY Type 425 Modified, ATI 436S™, ATI 440A™, ATI 440C™, ATI 800 AT™ ALLOY, ATI 800 H™ ALLOY, ATI 904L™, ATI 610™, ATI 611™, ATI 13-8Mo™, ATI 13-8 SuperTough®, AL 13-8 STAINLESS STEEL, ASTM Type XM-13, ATI 2003® DUPLEX, AL 20-25+Nb alloy, AL 29-4C®, AL 332Mo® alloy, AL 334Mo® alloy, ATI 201HP™, AL33, XM-29, ATI 4565™, ATI 50™, 22-13-5, XM-19, AL60, 21800, AL-6XN® ALLOY, AL-6XN Plus® ALLOY, A286 Altemp®, PC1017, Sea Cure® 26-3-3, Zeron® 100, 22-4-9, 21-11N, HOLDER BLOCK STEEL, MAXEL 400 SUPER, AL-6X, AL 404, Type 405, Type 446, AL 29-4C®, AL 29-4, AL 29-4-2, 14-4 FERRITIC, AL 453, AL 466, ALTEMP® ALLOY STEEL, 19-9-DL, Type 302B, ATI 409 Cb™, Type 409Ni, ATI 430Ti™, ALLEGHENY EDRO 441MOD1, ALLEGHENY CRUCIBLE 441MOD2, TOOL STEEL D2T, CSM-21 STAINLESS STEEL, ULTRACHEM STAINLESS STEEL, RA85H STEEL, 385, ZeCor™, RA 330™, ATI304B7 P/M™ BOR7

Recommended use of the chemical and restrictions on use

Recommended Use Stainless steel product manufacture.

Uses advised against

Details of the supplier of the safety data sheet

Manufacturer Address

ATI, 1000 Six PPG Place, Pittsburgh, PA
15222 USA

Emergency telephone number

Emergency Telephone Chemtrec: 1-800-424-9300

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200). This product is an article and, as such, does not present a hazard to human health by inhalation or ingestion.

Skin sensitization	Category 1
Carcinogenicity	Category 2
Specific target organ toxicity (repeated exposure)	Category 1

Label elements**Emergency Overview****Danger****Hazard statements**

Suspected of causing cancer
 May cause an allergic skin reaction
 Causes damage to respiratory track prolonged or repeated exposure if inhaled.



Appearance Various massive product forms

Physical state Solid

Odor Odorless

Precautionary Statements - Prevention

Do not handle until all safety precautions have been read and understood
 Use personal protective equipment as required
 Wear protective gloves

If skin irritation or rash occurs: Get medical advice/attention

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Not applicable

Other Information

When product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated: Zinc, copper, magnesium, or cadmium fumes may cause metal fumes fever, Titanium dioxide an IARC Group 2B carcinogen, Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer, Vanadium pentoxide (V2O5) affects eyes, skin, respiratory system, Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

3. COMPOSITION/INFORMATION ON INGREDIENTS**Synonyms**

Stainless Steel: ATI 20™, ATI 20-20+Nb™, ATI 201™, ATI 219™, 21-6-9, AL40, XM-11, ATI 301™, ATI 302™, ATI 303™, ATI 304™, ATI 305™, ATI 309™, ATI 310™, ATI 316™, ATI 317™, ATI 321™, ATI 255™ DUPLEX, ATI 332™, ATI 334™, ATI 347™, ATI 348™, AM 350®, AM 355™, ATI 403™, ATI Ohmaloy® 30, ATI Ohmaloy® 40, ATI Ohmaloy®, ATI 409 HP™, ATI 409 Cb™, ATI 410™, ATI 412™, Type 415, ATI 416™, ATI 420™, ATI 430™, ATI 433™, Type 434, Type 436, ATI 439™, ATI 439 HP™, XM-8, Type 441, 18-0, AL 18CrCb, ATI 441 HP™, ATI 444™, 18-2, ATI 468™, ATI 15-5™, ATI 17-4™, ATI 17-7™, ATI 15-7™, ATI JS700® ALLOY, ATI 800™ ALLOY, ATI 825™ ALLOY, Type 840, ATI E-BRITE® 26-1, ASTM XM 27, ATI 2205™ DUPLEX; 318, ATI 2205™ DUPLEX; 322, ATI 201LN™, Type 301L, ATI 304 DA™, Type 304H, ATI 304L™, 374L, Type 304LN, Type 304N, Type 309H, ATI 309S™, 398, Type 309Si, Type 310Cb, Type 310H, Type 310L, ATI 310S™, Type 310Si, ATI 316L™, 376, ATI 316LN™, ATI 316Ti™, ATI 317L™, ATI 317LMN™, 317 LX, 317 LXN, 317 XN, Type 321H, Type 410 MOD, Type 410HC, ATI 410S™, ATI 418 SPL™, Type 420HC, ALLEGHENY Type 425 Modified, ATI 436S™, ATI 440A™, ATI 440C™, ATI 800 AT™ ALLOY, ATI 800 H™ ALLOY, ATI 904L™, ATI 610™,

ATI 611™, ATI 13-8Mo™, ATI 13-8 SuperTough®, AL 13-8 STAINLESS STEEL, ASTM Type XM-13, ATI 2003® DUPLEX, AL 20-25+Nb alloy, AL 29-4C®, AL 332Mo® alloy, AL 334Mo® alloy, ATI 201HP™, AL33, XM-29, ATI 4565™, ATI 50™, 22-13-5, XM-19, AL60, 21800, AL-6XN® ALLOY, AL-6XN Plus® ALLOY, A286 Altemp®, PC1017, Sea Cure® 26-3-3, Zeron® 100, 22-4-9, 21-11N, HOLDER BLOCK STEEL, MAXEL 400 SUPER, AL-6X, AL 404, Type 405, Type 446, AL 29-4C®, AL 29-4, AL 29-4-2, 14-4 FERRITIC, AL 453, AL 466, ALTEMP® ALLOY STEEL, 19-9-DL, Type 302B, ATI 409 Cb™, Type 409Ni, ATI 430Ti™, ALLEGHENY EDRO 441MOD1, ALLEGHENY CRUCIBLE 441MOD2, TOOL STEEL D2T, CSM-21 STAINLESS STEEL, ULTRACHEM STAINLESS STEEL, RA85H STEEL, 385, ZeCor™, RA 330™, ATI304B7 P/M™ BOR7.

Chemical Name	CAS No.	Weight-%
Iron	7439-89-6	<90
Nickel	7440-02-0	0-46
Chromium	7440-47-3	10-30
Manganese	7439-96-5	0-10
Molybdenum	7439-98-7	0-7.0
Silicon	7440-21-3	0-6.5
Aluminum	7429-90-5	0-4.0
Copper	7440-50-8	0-4.0
Tungsten	7440-33-7	0-2.5
Titanium	7440-32-6	0-2.4
Boron	19287-88-8	0-2.25
Vanadium	7440-62-2	0-1.1
Tantalum	7440-25-7	0-1.0
Niobium (Columbium)	7440-03-1	0-1.0

4. FIRST AID MEASURES

First aid measures

Eye contact	In the case of particles coming in contact with eyes during processing, treat as with any foreign object.
Skin Contact	In the case of skin irritation or allergic reactions see a physician.
Inhalation	If excessive amounts of vapors, smoke, fume, or particles are inhaled during processing, remove to fresh air and consult a qualified health professional.
Ingestion	Not an expected route of exposure.

Most important symptoms and effects, both acute and delayed

Symptoms May cause allergic skin reaction.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Not flammable in the form of this product as distributed, flammable as finely divided particles or pieces resulting from processing of this product. Smother with salt (NaCl) or class D dry powder fire extinguisher.

Unsuitable extinguishing media Do not spray water on burning metal as an explosion may occur. This explosive characteristic is caused by the hydrogen and steam generated by the reaction of water with the burning material.

Specific hazards arising from the chemical

Intense heat. Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. **WARNING:** Fine particles resulting from grinding, buffing, polishing, or similar processes of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

Hazardous combustion products Titanium dioxide an IARC Group 2B carcinogen. Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer. Vanadium pentoxide (V₂O₅) affects eyes, skin, respiratory system. Zinc, copper, magnesium, or cadmium fumes may cause metal fumes fever. Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

Explosion data

Sensitivity to Mechanical Impact None.

Sensitivity to Static Discharge None.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH approved (or equivalent) respirator and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Use personal protective equipment as required.

For emergency responders Use personal protective equipment as required.

Environmental precautions

Environmental precautions Not applicable to massive product.

Methods and material for containment and cleaning up

Methods for containment Not applicable to massive product.

Methods for cleaning up Not applicable to massive product.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. **WARNING:** Fine particles resulting from grinding, buffing, polishing, or similar processes of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep chips, turnings, dust, and other small particles away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity).

Incompatible materials Dissolves in hydrofluoric acid. Ignites in the presence of fluorine. When heated above 200°C, reacts exothermically with the following: Chlorine, bromine, halocarbons, carbon tetrachloride, carbon tetrafluoride, and freon.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL
Iron 7439-89-6	-	-
Nickel 7440-02-0	TWA: 1.5 mg/m ³ inhalable fraction	TWA: 1 mg/m ³
Chromium 7440-47-3	TWA: 0.5 mg/m ³	TWA: 1 mg/m ³
Manganese 7439-96-5	TWA: 0.02 mg/m ³ respirable fraction TWA: 0.1 mg/m ³ inhalable fraction TWA: 0.02 mg/m ³ Mn TWA: 0.1 mg/m ³ Mn	(vacated) STEL: 3 mg/m ³ fume (vacated) Ceiling: 5 mg/m ³ Ceiling: 5 mg/m ³ fume Ceiling: 5 mg/m ³ Mn
Molybdenum 7439-98-7	TWA: 10 mg/m ³ inhalable fraction TWA: 3 mg/m ³ respirable fraction	-
Silicon 7440-21-3	-	TWA: 15 mg/m ³ total dust TWA: 5 mg/m ³ respirable fraction
Aluminum 7429-90-5	TWA: 1 mg/m ³ respirable fraction	TWA: 15 mg/m ³ total dust TWA: 5 mg/m ³ respirable fraction
Copper 7440-50-8	TWA: 0.2 mg/m ³ fume TWA: 1 mg/m ³ Cu dust and mist	TWA: 0.1 mg/m ³ fume TWA: 1 mg/m ³ dust and mist
Tungsten 7440-33-7	STEL: 10 mg/m ³ STEL: 10 mg/m ³ W TWA: 5 mg/m ³ TWA: 5 mg/m ³ W	(vacated) STEL: 10 mg/m ³ (vacated) STEL: 10 mg/m ³ W
Titanium 7440-32-6	-	-
Boron 19287-88-8	-	-
Vanadium 7440-62-2	-	Ceiling: 0.5 mg/m ³ V2O5 respirable dust Ceiling: 0.1 mg/m ³ V2O5 fume
Tantalum 7440-25-7	-	TWA: 5 mg/m ³
Niobium (Columbium) 7440-03-1	-	-

Appropriate engineering controls

Engineering Controls Avoid generation of uncontrolled particles.

Individual protection measures, such as personal protective equipment

Eye/face protection	When airborne particles may be present, appropriate eye protection is recommended. For example, tight-fitting goggles, foam-lined safety glasses or other protective equipment that shield the eyes from particles.
Skin and body protection	Fire/flammable resistant/retardant clothing may be appropriate during hot work with the product. Cut-resistant gloves and/or protective clothing may be appropriate when sharp surfaces are present.
Respiratory protection	When particulates/fumes/gases are generated and if exposure limits are exceeded or irritation is experienced, proper approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Solid	Odor	Odorless
Appearance	Various massive product forms	Odor threshold	Not applicable
Color	metallic, gray		

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	-	
Melting point/freezing point	1430-1540 °C / 2600-2800 °F	

Boiling point / boiling range	-	
Flash point	-	
Evaporation rate	-	Not applicable
Flammability (solid, gas)	-	Not flammable in the form of this product as distributed, flammable as finely divided particles or pieces resulting from processing of this product
Flammability Limit in Air		Not applicable
Upper flammability limit:	-	
Lower flammability limit:	-	
Vapor pressure	-	Not applicable
Vapor density	-	Not applicable
Specific Gravity	7-9	
Water solubility	Insoluble	Insoluble
Solubility in other solvents	-	Not applicable
Partition coefficient	-	Not applicable
Autoignition temperature	-	Not applicable
Decomposition temperature	-	Not applicable
Kinematic viscosity	-	Not applicable
Dynamic viscosity	-	Not applicable
Explosive properties	Not applicable	
Oxidizing properties	Not applicable	

Other Information

Softening point	-
Molecular weight	-
VOC Content (%)	Not applicable
Density	-
Bulk density	-

10. STABILITY AND REACTIVITY**Reactivity**

Not applicable

Chemical stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None under normal processing.

Hazardous polymerization	Hazardous polymerization does not occur.
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Conditions to avoid

Dust formation and dust accumulation;

Incompatible materials

Dissolves in hydrofluoric acid. Ignites in the presence of fluorine. When heated above 200°C, reacts exothermically with the following: Chlorine, bromine, halocarbons, carbon tetrachloride, carbon tetrafluoride, and freon.

Hazardous Decomposition ProductsWhen product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated: Titanium dioxide an IARC Group 2B carcinogen. Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer. Vanadium pentoxide (V₂O₅) affects eyes, skin, respiratory system. Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.**11. TOXICOLOGICAL INFORMATION****Information on likely routes of exposure**

Product Information

Inhalation	Not an expected route of exposure for product in massive form.
Eye contact	Not an expected route of exposure for product in massive form.
Skin Contact	May cause sensitization by skin contact.
Ingestion	Not an expected route of exposure for product in massive form.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Iron 7439-89-6	98,600 mg/kg bw	-	> 0.25 mg/L
Nickel 7440-02-0	> 9000 mg/kg bw	-	> 10.2 mg/L
Chromium 7440-47-3	> 3400 mg/kg bw	-	> 5.41 mg/L
Manganese 7439-96-5	>2000 mg/kg bw	-	>5.14 mg/L
Molybdenum 7439-98-7	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.10 mg/L
Silicon 7440-21-3	> 5000 mg/kg bw	> 5000 mg/kg bw	> 2.08 mg/L
Copper 7440-50-8	481 mg/kg bw	>2000 mg/kg bw	>5.11 mg/L
Aluminum 7429-90-5	15,900 mg/kg bw	-	> 1 mg/L
Tungsten 7440-33-7	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.4 mg/L
Titanium 7440-32-6	> 5000 mg/kg bw	-	-
Boron 19287-88-8	> 2000 mg/kg bw	-	-
Vanadium 7440-62-2	> 2000 mg/kg bw	-	-
Tantalum 7440-25-7	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.18 mg/L
Niobium (Columbium) 7440-03-1	> 10,000 mg/kg bw	> 2000 mg/kg bw	-

Information on toxicological effects

Symptoms May cause sensitization by skin contact.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Acute toxicity Product not classified.
Skin corrosion/irritation Product not classified.
Serious eye damage/eye irritation Product not classified.
Sensitization May cause sensitization by skin contact.
Germ cell mutagenicity Product not classified.
Carcinogenicity May cause cancer by inhalation.

Chemical Name	ACGIH	IARC	NTP	OSHA
Nickel 7440-02-0		Group 1 Group 2B	Known Reasonably Anticipated	X
Chromium 7440-47-3		Group 3		

Reproductive toxicity Product not classified.
STOT - single exposure Product not classified.
STOT - repeated exposure Causes disorder and damage to the: Respiratory System.
Aspiration hazard Product not classified.

12. ECOLOGICAL INFORMATION

Ecotoxicity

This product as shipped is not classified for aquatic toxicity. This product contains a chemical which is listed as a severe marine pollutant according to IMDG/IMO

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Iron 7439-89-6	-	The 96 h LC50 of 50% iron oxide black in water to <i>Danio rerio</i> was greater than 10,000 mg/L.	The 3 h EC50 of iron oxide for activated sludge was greater than 10,000 mg/L.	The 48 h EC50 of iron oxide to <i>Daphnia magna</i> was greater than 100 mg/L.
Nickel 7440-02-0	NOEC/EC10 values range from 12.3 µg/l for <i>Scenedesmus accuminatus</i> to 425 µg/l for <i>Pseudokirchneriella subcapitata</i> .	The 96h LC50s values range from 0.4 mg Ni/L for <i>Pimephales promelas</i> to 320 mg Ni/L for <i>Brachydanio rerio</i> .	The 30 min EC50 of nickel for activated sludge was 33 mg Ni/L.	The 48h LC50s values range from 0.013 mg Ni/L for <i>Ceriodaphnia dubia</i> to 4970 mg Ni/L for <i>Daphnia magna</i> .
Chromium 7440-47-3	-	-	-	-
Manganese 7439-96-5	The 72 h EC50 of manganese to <i>Desmodesmus subspicatus</i> was 2.8 mg of Mn/L.	The 96 h LC50 of manganese to <i>Oncorhynchus mykiss</i> was greater than 3.6 mg of Mn/L.	The 3 h EC50 of manganese for activated sludge was greater than 1000 mg/L.	The 48 h EC50 of manganese to <i>Daphnia magna</i> was greater than 1.6 mg/L.
Molybdenum 7439-98-7	The 72 h EC50 of sodium molybdate dihydrate to <i>Pseudokirchneriella subcapitata</i> was 362.9 mg of Mo/L.	The 96 h LC50 of sodium molybdate dihydrate to <i>Pimephales promelas</i> was 644.2 mg/L.	The 3 h EC50 of molybdenum trioxide for activated sludge was 820 mg/L.	The 48 h LC50 of sodium molybdate dihydrate to <i>Ceriodaphnia dubia</i> was 1,015 mg/L. The 48 h LC50 of sodium molybdate dihydrate to <i>Daphnia magna</i> was greater than 1,727.8 mg/L.
Silicon 7440-21-3	The 72 h EC50 of sodium metasilicate pentahydrate to <i>Pseudokirchnerella subcapitata</i> was greater than 250 mg/L.	-	-	-
Aluminum 7429-90-5	The 96-h EC50 values for reduction of biomass of <i>Pseudokirchneriella subcapitata</i> in AAP-Medium at pH 6, 7, and 8 were estimated as 20.1, 5.4, and 150.6 µg/L, respectively, for dissolved Al.	The 96 h LC50 of aluminum to <i>Oncorhynchus mykiss</i> was 7.4 mg of Al/L at pH 6.5 and 14.6 mg of Al/L at pH 7.5	-	The 48-hr LC50 for <i>Ceriodaphnia dubia</i> exposed to Aluminium chloride increased from 0.72 to greater than 99.6 mg/L with water hardness increasing from 25 to 200 mg/L.
Copper 7440-50-8	The 72 h EC50 values of copper chloride to <i>Pseudokirchneriella subcapitata</i> ranged between 30 µg/L (pH 7.02, hardness 250 mg/L CaCO ₃ , DOC 1.95 mg/L) and 824 µg/L (pH 6.22, hardness 100 mg/L CaCO ₃ , DOC 15.8 mg/L).	The 96-hr LC50 for <i>Pimephales promelas</i> exposed to Copper sulfate ranged from 256.2 to 38.4 µg/L with water hardness increasing from 45 to 255.7 mg/L.	The 24 h NOEC of copper chloride for activated sludge ranged from 0.32 to 0.64 mg of Cu/L.	The 48 h LC50 values for <i>Daphnia magna</i> exposed to copper in natural water ranged between 33.8 µg/L (pH 6.1, hardness 12.4 mg/L CaCO ₃ , DOC 2.34 mg/L) and 792 µg/L (pH 7.35, hardness 139.7 mg/L CaCO ₃ , DOC 22.8 mg/L).
Tungsten 7440-33-7	The 72 h EC50 of sodium tungstate to <i>Pseudokirchnerella subcapitata</i> was 31.0 mg of W/L.	The 96 h LC50 of sodium tungstate to <i>Danio rerio</i> was greater than 106 mg of W/L.	The 30 min EC50 of sodium tungstate for activated sludge were greater than 1000 mg/L.	The 48 h EC50 of sodium tungstate to <i>Daphnia magna</i> was greater than 96 mg of W/L.
Titanium 7440-32-6	The 72 h EC50 of titanium dioxide to <i>Pseudokirchnerella subcapitata</i> was 61 mg of TiO ₂ /L.	The 96 h LC50 of titanium dioxide to <i>Cyprinodon variegatus</i> was greater than 10,000 mg of TiO ₂ /L. The 96 h LC50 of titanium dioxide to <i>Pimephales promelas</i> was greater than 1,000 mg of TiO ₂ /L.	The 3 h EC50 of titanium dioxide for activated sludge were greater than 1000 mg/L.	The 48 h EC50 of titanium dioxide to <i>Daphnia Magna</i> was greater than 1000 mg of TiO ₂ /L.

Boron 19287-88-8	The 72-h EC50 value for reduction of biomass of <i>Pseudokirchneriella subcapitata</i> exposed to Boric acid at pH 7.5 to 8.3 was 40.2 mg/L.	The 96-hr LC50 for <i>Pimephales promelas</i> exposed to Boric acid (82%)/borax (18%) mixture was 79.7 mg/L with water hardness of 91 mg/L and water pH of 8.0.	The 3 h NOEC of boric acid for activated sludge ranged from 17.5 to 20 mg/L.	The 48-hr LC50 for <i>Ceriodaphnia dubia</i> exposed to Boric acid/borax mixture ranged from 91 to 165 mg/L with pH ranging from 6.7 to 8.4.
Vanadium 7440-62-2	The 72 h EC50 of vanadium pentoxide to <i>Desmodesmus subspicatus</i> was 2,907 ug of V/L.	The 96 h LC50 of vanadium pentoxide to <i>Pimephales promelas</i> was 1,850 ug of V/L.	The 3 h EC50 of sodium metavanadate for activated sludge was greater than 100 mg/L.	The 48 h EC50 of sodium vanadate to <i>Daphnia magna</i> was 2,661 ug of V/L.
Tantalum 7440-25-7	-	-	-	-
Niobium (Columbium) 7440-03-1	-	-	-	-

Persistence and degradability

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Bioaccumulation

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Other adverse effects

This product as shipped is not classified for environmental endpoints. However, when subjected to sawing or grinding, particles may be generated that are classified for aquatic acute or aquatic chronic toxicity.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods**Disposal of wastes**

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated packaging

None anticipated.

Chemical Name	RCRA - D Series Wastes
Chromium 7440-47-3	5.0 mg/L regulatory level

This product contains one or more substances that are listed with the State of California as a hazardous waste.

14. TRANSPORT INFORMATION

DOT

Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372: Chromium (Cr)

Chemical Name	CAS No.	Weight-%	SARA 313 - Threshold Values %
Nickel - 7440-02-0	7440-02-0	0-46	0.1
Chromium - 7440-47-3	7440-47-3	10-30	1.0
Manganese - 7439-96-5	7439-96-5	0-10	1.0
Copper - 7440-50-8	7440-50-8	0-4.0	1.0

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	Yes
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Nickel 7440-02-0		X	X	
Chromium 7440-47-3		X	X	
Copper 7440-50-8		X	X	

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs
Nickel 7440-02-0	100 lb
Chromium 7440-47-3	5000 lb
Copper 7440-50-8	5000 lb

US State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals

Chemical Name	California Proposition 65
Nickel - 7440-02-0	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Nickel 7440-02-0	X	X	X

Chromium 7440-47-3	X	X	X
Manganese 7439-96-5	X	X	X
Molybdenum 7439-98-7	X	X	X
Silicon 7440-21-3	X	X	X
Copper 7440-50-8	X	X	X
Aluminum 7429-90-5	X	X	X
Tungsten 7440-33-7	X	X	X
Titanium 7440-32-6	X		
Vanadium 7440-62-2	X	X	X
Tantalum 7440-25-7	X	X	X

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

16. OTHER INFORMATION

NFPA Health hazards 1 Flammability 0 Instability 0 Physical and Chemical Properties -
HMIS Health hazards 2* Flammability 0 Physical hazards 0 Personal protection X
*Chronic Hazard Star Legend * = Chronic Health Hazard*

Issue Date 28-May-2015

Revision Date 27-May-2016

Revision Note

Updated Section(s): 1, 3, 7

Note:

The information provided in this safety data sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet

Additional information available from: Safety data sheets and labels available at ATImetals.com

1. IDENTIFICATION

COMPANY IDENTIFICATION

United States

Purity Zinc Metals, LLC.
498 International Boulevard
Clarksville, TN 37040
(931) 552-8080 Phone
(931) 552-5588 Fax
(800) 388-3952 Toll Free

Canada

Purity Zinc Metals
A Division of North American Zinc Company
290 Arvin Avenue
Stoney Creek, ON L8E 2M1 Canada
(905) 662-4802 Phone
(905) 664-3944 Fax

PRODUCT

Product Name:	Purity Zinc Dust	UP Grades
Chemical Name:	Zinc (Zn) Dust	
Trade Name:	Purity Zinc Dust	UltraPure™ Zinc Dust
Chemical Formula:	Zn	
CAS#	7440-66-6	

EMERGENCY TELEPHONE

(800) 388-3952 x243 Doug Dobbs

DATE REVISED

May 7th, 2015

All previous versions are superseded by the current version

Recommended Usage: Zinc dust is used to coat steel for corrosion protection (galvanizing, electroplating and electro-galvanizing), as an alloying element in bronze, brass, aluminum and other metal alloys, for zinc die casting alloys, for zinc dry cell and zinc/air batteries, for the production of various architectural products and as a reducing agent in organic chemistry and for other chemical applications.

Restrictions on Use: Any use of this product other than as described above, is beyond the prevue of this SDS and no guarantees or warranties, explicit or implied, on performance or safety of the product, its usage, the process or results is given.

2. HAZARD IDENTIFICATION

WARNING!

MAY FORM COMBUSTIBLE DUST CONCENTRATIONS IN AIR (DURING PROCESSING)



H320: Causes eye irritation

H335: May cause respiratory irritation

H411: Toxic to aquatic life with long-lasting effects

Emergency Overview: A greyish metal powder with the potential to be combustible under circumstances described in Section 9. Contact with alkalis generates flammable hydrogen gas which can

accumulate in poorly-ventilated areas. Zinc is a relatively non-toxic chemical and poses little immediate health hazard to personnel or the environment in an emergency situation.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS#	Weight%
Total Zinc		99.0 Min
Metallic Zinc	7440-66-6	96.0 Min
Zinc Oxide	1314-13-2	2-4
Lead	7439-92-1	0.002 Max
Cadmium	7440-43-9	0.001 Max
Iron	7439-89-6	0.002 Max
Copper	7440-50-8	0.001 Max

See section 8 for information on OEL, PEL, TVL and LD₅₀/LC₅₀ data.

4. FIRST-AID MEASURES

Acute Exposure Symptoms:

Inhalation: Inhalation of zinc oxide fume from fire or welding on zinc-coated surfaces may cause zinc shakes or metal fume fever (a benign transient flu-like condition), stomach cramps or diarrhea.

Ingestion: Large oral intake may produce gastro-intestinal irritation.

Skin Contact: Zinc dust contact causes skin dryness.

Eye Contact: Becomes a mechanical irritant in the eye.

Carcinogenicity: This product is not listed by the NTP or IARC and is not regulated as a carcinogen by OSHA.

Recommendation for Exposures:

Inhalation: Remove the exposed person to fresh air immediately. Seek medical attention as soon as possible.

Ingestion: Give two (2) to three (3) cups of water or milk if victim is conscious. Do not induce vomiting. Get medical attention immediately.

Skin: Wash with soap and water. Seek medical attention if irritation persists.

Eyes: Flush eyes and under eyelids with warm, gently running water for at least fifteen (15) minutes. If irritation persists consult a physician.

5. FIRE-FIGHTING MEASURES

Explosion: Avoid generating dust; fine dust dispersed in air in sufficient concentrations and in the presence of an ignition source is a potential dust explosion hazard.

Means of Extinction: Blanket with Class D dry powder type extinguisher or smother with dry sand. Avoid water. Do not disturb until extinguished. Contact with acids and alkali hydroxides results in

generation of potentially explosive hydrogen gas. Firefighters should wear PPE and SCBA with full face piece operated in positive pressure mode.

Method of Cleanup: Wet zinc dust should be collected into an open container and set into an open, well ventilated area to allow for drying. Once dry, zinc dust can be disposed of in accordance with local, state, provincial and national regulations.

6. ACCIDENTAL RELEASE MEASURES

Emergency Procedures: Evacuate the area to prevent inhalation of zinc dust by unprotected workers. Remove potential for ignition by turning off sources of flame and other ignition sources. Allow airborne dust to settle then sweep up dust and dispose of in accordance with local, provincial, state or national regulations.

Environmental Precautions: Transfer wet zinc to an open container and move to an open well-ventilated area to allow for drying. Store in a dry area and avoid wetting. Report leakage to water to local environmental authorities for appropriate clean up measures. Leakage to roadways and ground should be swept up and nuisance dust kept to a minimum.

Chemical Hazards from Fire: Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Avoid dispersal in the air (i.e., clearing dust surfaces with compressed air). When exposed to fire zinc dust decomposes to zinc oxide. Zinc oxide fume may be hazardous if inhaled.

7. HANDLING AND STORAGE

Safe Handling: Wear PPE in accordance with Section 8 when handling zinc dust. Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Dry powders can build static electricity charges when subjected to the friction of transfer and mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmosphere.

Storage: Store zinc dust in manufacturer's containers when possible. Tightly reseal any open containers and ensure presence of desiccant packets if originally supplied by the manufacturer to product specifications. Containers of zinc dust should be stored in well ventilated and dry areas to prevent the zinc dust from becoming wet.

Storage Incompatibilities: Alkalis, sulphur, strong acids and bases, oxidizers, chlorinated solvents and water or other sources of moisture.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Control: It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen deficient environment. Ensure that dust handling systems (such as exhaust ducts, dust collectors, vessels and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment). Use only appropriately classified electrical equipment and powered industrial trucks.

Personal Protection: Recommended PPE include (but is not limited to) NIOSH N98-N99 respirator filters, latex, nitrile or other rubber gloves, eye protection as described under ANSI Z87.1 2003 standard and clothing sufficient to provide coverage from skin contact to airborne dusts.

Regulatory Limits:

Component	CAS#	Limit	Value
Metallic Zinc	7440-66-6	OSHA PEL	None Established
Metallic Zinc	7440-66-6	LD ₅₀ /LC ₅₀	None Established
Zinc Oxide Dust	1314-13-2	OSHA PEL	15mg/m ³ (total), 5mg/m ³ (respirable)
Zinc Oxide Fume	1314-13-2	OSHA PEL	5mg/m ³
Zinc Oxide	1314-13-2	ACGIH TVL	2mg/m ³ (respirable)
Zinc Oxide	1314-13-2	ACGIH STEL	10mg/m ³ (respirable)
Zinc Oxide	1314-13-2	NIOSH REL	5mg/m ³
Zinc Oxide	1314-13-2	NIOSH TWA	15mg/m ³ (10 hour ceiling)
Zinc Oxide	1314-13-2	NIOSH STEL	10mg/m ³ (15 minute sample)

ACGIH	American Conference of Governmental Industrial Hygienists
NIOSH	National Institute for Occupational Safety & Health
OSHA	Occupational Safety & Health Administration
PEL	Permissible Exposure Limit
REL	Recommended Exposure Limit
STEL	Short Term Exposure Limit
TVL	Threshold Limit Value
TWA	Time Weighted Average

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical Properties:

Physical State	Blue-grey powder
Odor	Odorless
Specific Gravity	7.0-7.1
pH	Not Applicable
Flash Point	Not Applicable
Melting Point	787°F (419°C)
Boiling Point	1665°F (906°C)

Explosive Properties:

Minimum Ignition Energy (mJ)	1,000-10,000
Minimum Ignition Temperature °C (Dust Cloud)	610-620
Minimum Ignition Temperature °C (Dust Layer)	>400
Minimum Explosible Concentration (g/m ³)	700-750

Explosion Severity (20L Sphere):

Maximum Explosion Pressure (bar)	4.9
Maximum Rate of Pressure (bar/s)	130

K_{ST} Value (bar.m/s)

35

10. STABILITY AND REACTIVITY

Conditions to avoid: Heat, flames, ignition sources and incompatibles like sulphur, strong oxidizing agents and alkaline hydroxides.

Hazardous Decomposition: Heat generated zinc oxide fume. Contact with acids or alkaline hydroxides may generate hydrogen gas, which is flammable. Reactivity with water is similar but very slow. Under normal conditions, zinc dust is stable.

11. TOXICOLOGICAL INFORMATION

Routes of Exposure:

Inhalation: Inhalation of zinc oxide fume from fire or welding on zinc-coated surfaces may cause zinc shakes, metal fume fever, stomach cramps and/or diarrhea.

Ingestion: Large oral intake may produce gastro-intestinal irritation.

Skin Contact: Zinc dust contact causes skin dryness.

Eye Contact: Becomes a mechanical irritant in the eye.

Acute Exposure Symptoms:

Inhalation: Inhalation of zinc oxide fume from fire or welding on zinc-coated surfaces may cause zinc shakes or metal fume fever (a benign transient flu-like condition), stomach cramps or diarrhea.

Ingestion: Large Oral intake may produce gastro-intestinal irritation.

Skin Contact: Zinc dust contact causes skin dryness.

Eye Contact: Becomes a mechanical irritant in the eye.

Carcinogenicity: This product is not listed by the NTP or IARC and is not regulated as a carcinogen by OSHA.

12. ECOLOGICAL INFORMATION

Zinc in the metallic dust form is insoluble but its processing or extended exposure in the aquatic and terrestrial environments may lead to the release of zinc in bioavailable forms. Zinc is mobile and can be toxic in the aquatic environment with water hardness, pH and dissolved organic carbon content being regulating factors. It bio accumulates in both plants and animals as well as in terrestrial and aquatic systems. Zinc is moderately mobile in soils and is dependent on soil conditions such as cat ion exchange capacity, pH, redox potential and chemical species present in the soil. Zinc also bio accumulates in terrestrial plants, vertebrates and mammals with plant uptake dependent on soil composition.

13. DISPOSAL CONSIDERATIONS

If material cannot be returned to manufacturer with approval, dispose of in accordance with applicable local, state, provincial or national regulations.

14. TRANSPORT INFORMATION

Proper Shipping Name	Zinc Powder or Zinc Dust
U.S. DOT Classification	§172.332 & §172.560
Transport Canada Hazard Classification	TDGA, Product is Not Regulated
IMDG Code	Not Regulated
Marine Pollutant	Not Regulated
Packaging Restrictions	UN 3077 Class 9

This product only falls under UN 3077 Class 9 when an individual package exceeds 999 lbs. net product weight.

Examples:

- 14.1. One pallet, net weight 2,000 lbs. of 27 x 3.5 gallon cans, would not meet the requirement for UN 3077 Class 9 as $2,000/27=74.07$ lbs. each (net).
- 14.2. One pallet, net weight 1,000 lbs. of 1 x bulk bag would require UN 3077 Class 9. $1,000/1=1,000$ lbs.

15. REGULATORY INFORMATION

This product was laboratory tested to determine classification for transportation according to flammable solids, self-heating substances and substances which on contact with water emit flammable gasses against the following regulations:

- 15.1. U.S. Code of Federal Regulations, Transportation, Chapter 49, Parts 100 to 177, Revised as of Oct. 1 – 1992, Part 173, Appendix E
- 15.2. Transportation of Dangerous Goods Act and Regulations (Canada)
- 15.3. International Marine Dangerous Goods Regulations
- 15.4. Dangerous Goods Regulations 1995 International Air Transport Association (IATA) Flammable Solids Division 4.1

Test results confirm that this product did not meet the criteria for inclusion into class 4.1, 4.2 and 4.3 Packaging Group I, II, or III. As such zinc dust containers are not subject to hazardous labeling 4.1, 4.2, or 4.3.

16. OTHER INFORMATION**HMIS**

Health	1
Flammability	1
Physical Hazard	1

NFPA**Disclaimer:**

Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. Purity Zinc Metals, LLC provides no warranties either expressed or implied and assumes no responsibility for the accuracy or completeness of the data contained herein and expressly disclaims all liability for reliance thereon. The SDS for this product is provided as a guide for safe handling and usage. Those using the product should read and understand the information herein and properly train those using this product.

Refer to NFPA 654, *Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids*, for further safe handling precautions and techniques.

///END OF SDS///

NUCOR

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Trade Name: Carbon and Alloy Steels

CAS Number: Not applicable

Synonyms: Steels

Use/Description: Plate products

Company Identification: Nucor Steel Hertford County PO Box 279 Winton, North Carolina 27986 Nucor Steel Tuscaloosa, Inc. 1700 Holt Road, N.E. Tuscaloosa, Alabama 35404 Nucor Steel Longview LLC PO Box 7679 Longview, TX 75607	24 Hour Contact – CHEMTREC 1-800-424-9300 Safety Officer [8:00 am – 5:00 pm]: 1-252-356-3929 Safety Officer [8:00 am – 5:00 pm]: 1-205-562-1244
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For general product information, contact facility as listed above. For emergencies, use the 24 Hour Contact.

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.

Carbon and Alloy Steels

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						
Aluminum (Al)	7429-90-5	0-0.10	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	<0.9	10	Oxide Dust	15	Oxide Dust
Cadmium (Cd)	7440-43-9	<0.01	0.01	As Cadmium (A2 Carcinogen)	0.005	As Cadmium

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Components	CAS No.	% Weight	Exposure Limits			
			ACGIH TLV (mg/m ³)		OSHA PEL (mg/m ³)	
Calcium (Ca)	1305-78-8	<0.9	0.002 2	Respirable fraction Oxide Dust	0.0025 5	As Cadmium (Action Level) Oxide Dust
Carbon (C)	7440-44-0	<1.0		Not Established		Not Established
Chromium (Cr)	7440-47-3	0.01-2.0	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	<1.5	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	0-2	0.2	Elemental Mn and Inorg Compounds	5	Fume (Ceiling)
Molybdenum (Mo)	7439-98-7	<0.9	10	Insoluble Compounds	15	Insoluble Compounds
Niobium (Nb)	7440-03-1	<0.9		Not Established		
Nickel (Ni)	7440-02-0	0.01-3.5	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	<0.9	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	0.0-0.01	10 5 10	Oxide Dust Oxide Fume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust

NOTE: No permissible exposure limits (PEL) or threshold limit values (TLV) exist for steel. The above listing is a summary of elements used in alloying Nucor Steel Products. Various grades of steel will contain different combinations of these elements and/or trace materials. Exact specifications may be found by calling the division and asking for a specifications sheet.

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.

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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 (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.

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. 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.

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

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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 °F

pH - Not applicable

Specific Gravity (at 15.6°C) - Not applicable

Density (at 15.6 °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.

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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.

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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 "*").

<u>Chemical Name</u>	<u>Reportable Quantity (in lb)</u>
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 (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):

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SECTION 313 REPORTABLE INGREDIENTS:

<u>Chemical Name</u>	<u>CAS Number</u>	<u>Concentration (% by weight)</u>	<u>Reportable</u>
Aluminum	7429-90-5	<0.10	No – Less 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	0.01-2.0	Yes – Greater than 0.1%
Cobalt	7440-48-4	<0.09	No – Less than 0.1%
Copper	7440-50-8	<1.5	Yes – Greater than 0.1%
Lead	7439-92-1	0.0-0.04	Yes
Manganese	7439-96-5	0-2	Yes – Greater than 1%
Nickel	7440-02-0	0.01-3.5	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	<0.9	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	Zinc-It® Instant Cold Galvanize
Other means of identification	
Product code	18413
Recommended use	Coating (for use in shop applications or on non-stationary structures)
Recommended restrictions	None known.
Manufacturer/Importer/Supplier/Distributor information	
Manufactured or sold by:	
Company name	CRC Industries, Inc.
Address	885 Louis Dr. Warminster, PA 18974 US
Telephone	
General Information	215-674-4300
Technical Assistance	800-521-3168
Customer Service	800-272-4620
24-Hour Emergency (CHEMTREC)	800-424-9300 (US) 703-527-3887 (International)
Website	www.crcindustries.com

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 2
Health hazards	Acute toxicity, oral	Category 4
	Acute toxicity, dermal	Category 4
	Acute toxicity, inhalation	Category 4
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Carcinogenicity	Category 2
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
	Specific target organ toxicity, repeated exposure	Category 1
Environmental hazards	Aspiration hazard	Category 1
	Hazardous to the aquatic environment, long-term hazard	Category 1
OSHA defined hazards	Not classified.	
Label elements		



Signal word Danger

Hazard statement Highly flammable liquid and vapor. Harmful if swallowed, in contact with skin or if inhaled. May be fatal if swallowed and enters airways. Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation. Suspected of causing cancer by inhalation. Causes damage to organs (central nervous system, liver, kidneys) through prolonged or repeated exposure. Very toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Use only with adequate ventilation; maintain ventilation during use and until all vapors are gone. Open doors and windows or use other means to ensure a fresh air supply during use and while product is drying. If you experience any symptoms listed on this label, increase ventilation or leave the area. Do not breathe vapor. Wear protective gloves/protective clothing/eye protection/face protection. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment.

Response

If swallowed: Immediately call a poison center/doctor. Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical attention. Wash contaminated clothing before reuse. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell. If exposed or concerned: Get medical attention. In case of fire: Do not use water. Collect spillage.

Storage

Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national regulations.

Hazard(s) not otherwise classified (HNOC)

None known.

Supplemental information

14.5% of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Zinc, Elemental		7440-66-6	70 - 80
Xylene		1330-20-7	10 - 20
Aliphatic hydrocarbon		Mixture	1 - 3
Ethylbenzene		100-41-4	1 - 3

Specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing stops, provide artificial respiration. Oxygen or artificial respiration if needed. Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact

Take off immediately all contaminated clothing. Wash with plenty of soap and water. Get medical advice/attention if you feel unwell. Wash contaminated clothing before reuse.

Eye contact

Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Ingestion

Call a physician or poison control center immediately. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Most important symptoms/effects, acute and delayed

Aspiration may cause pulmonary edema and pneumonitis. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation. Skin irritation. May cause redness and pain. Prolonged exposure may cause chronic effects.

Indication of immediate medical attention and special treatment needed

Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General information

Take off all contaminated clothing immediately. IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media

Foam. Dry chemical powder. Carbon dioxide (CO₂).

Unsuitable extinguishing media

Water.

Specific hazards arising from the chemical

Vapors may form explosive mixtures with air. Vapors may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed. Do not use water. Hydrogen gas may form producing an explosive environment.

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

In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk. Do not use water. Do not mix with acid or caustic materials.

General fire hazards

Highly flammable liquid and vapor.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Avoid inhalation of vapors and spray mists. Do not breathe vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Take precautionary measures against static discharge. Use only non-sparking tools. Dike far ahead of spill for later disposal.

Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Environmental precautions

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS. Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Explosion-proof general and local exhaust ventilation. Take precautionary measures against static discharges. Use non-sparking tools and explosion-proof equipment. Do not breathe vapor. Do not taste or swallow. Avoid inhalation of vapors and spray mists. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. When using, do not eat, drink or smoke. Should be handled in closed systems, if possible. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Wash contaminated clothing before reuse. Observe good industrial hygiene practices.

For product usage instructions, please see the product label. No Smoking in areas where this material is used. Keep containers closed and upright when not in use. If the painted surface is to be welded, use a fan across the work area to prevent fumes from rising to the welder's face. Pump air into welder's hood to provide positive air pressure to prevent fumes from getting to welder.

Conditions for safe storage, including any incompatibilities

Keep away from heat, sparks and open flame. Store in a cool, dry place out of direct sunlight. Keep container tightly closed. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

U.S. - OSHA Components

Type

Value

Aliphatic hydrocarbon

TWA

5 mg/m3

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) Components

Type

Value

Ethylbenzene (CAS 100-41-4)

PEL

435 mg/m3

Xylene (CAS 1330-20-7)

PEL

100 ppm

435 mg/m3

100 ppm

ACGIH

Components	Type	Value
Aliphatic hydrocarbon	TWA	5 mg/m ³

US. ACGIH Threshold Limit Values

Components	Type	Value
Ethylbenzene (CAS 100-41-4)	TWA	20 ppm
Xylene (CAS 1330-20-7)	STEL	150 ppm
	TWA	100 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Ethylbenzene (CAS 100-41-4)	STEL	545 mg/m ³
	TWA	125 ppm
		435 mg/m ³
		100 ppm

Biological limit values**ACGIH Biological Exposure Indices**

Components	Value	Determinant	Specimen	Sampling Time
Ethylbenzene (CAS 100-41-4)	0.15 g/g	Sum of mandelic acid and phenylglyoxylic acid	Creatinine in urine	*
Xylene (CAS 1330-20-7)	1.5 g/g	Methylhippuric acids	Creatinine in urine	*

* - For sampling details, please see the source document.

Appropriate engineering controls

Explosion-proof general and local exhaust ventilation. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower should be available when handling this product. Provide eyewash station. Eye wash fountain and emergency showers are recommended.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear protective gloves such as: Nitrile. Neoprene.

Other Wear appropriate chemical resistant clothing.

Respiratory protection If engineering controls are not feasible or if exposure exceeds the applicable exposure limits, use a NIOSH-approved cartridge respirator with an organic vapor cartridge. Use a self-contained breathing apparatus in confined spaces and for emergencies. Air monitoring is needed to determine actual employee exposure levels.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Observe any medical surveillance requirements. When using do not smoke. Wash hands after handling and before eating. Keep away from food and drink.

9. Physical and chemical properties**Appearance**

Physical state Liquid.

Form Liquid.

Color Gray.

Odor Solvent.

Odor threshold Not available.

pH Not available.

Melting point/freezing point -138.8 °F (-94.9 °C) estimated

Initial boiling point and boiling range	210 °F (98.9 °C)
Flash point	45 °F (7.2 °C) Tag Closed Cup
Evaporation rate	Slow.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	0.7 %
Flammability limit - upper (%)	22.7 %
Vapor pressure	1.2 hPa estimated
Vapor density	> 1 (air = 1)
Relative density	2.47
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	810 °F (432.2 °C) estimated
Decomposition temperature	Not available.
Viscosity (kinematic)	Not available.
Percent volatile	58.1 %

10. Stability and reactivity

Reactivity	The 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	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Avoid heat, sparks, open flames and other ignition sources. Contact with incompatible materials.
Incompatible materials	Never add water to this product. Acids. Alkalines. Caustics. Oxidizing agents.
Hazardous decomposition products	Carbon oxides.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Harmful if inhaled. May cause damage to organs through prolonged or repeated exposure by inhalation.
Skin contact	Harmful in contact with skin. Causes skin irritation.
Eye contact	Causes serious eye irritation.
Ingestion	Harmful if swallowed. Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.
Symptoms related to the physical, chemical and toxicological characteristics	Aspiration may cause pulmonary edema and pneumonitis. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation. Skin irritation. May cause redness and pain.

Information on toxicological effects

Acute toxicity	May be fatal if swallowed and enters airways. Harmful if inhaled. Harmful in contact with skin. May cause respiratory irritation.
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Product	Species	Test Results
Zinc-It® Instant Cold Galvanize		
Acute		
Dermal		
LD50	Rabbit	28264 mg/kg estimated
Inhalation		
LC50	Rat	34412 ppm, 4 hours estimated 151 mg/l, 4 hours estimated

Product	Species	Test Results
Oral LD50	Rat	2467 mg/kg estimated

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/eye irritation	Causes serious eye irritation.
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	Suspected of causing cancer by inhalation.

IARC Monographs. Overall Evaluation of Carcinogenicity

Ethylbenzene (CAS 100-41-4)	2B Possibly carcinogenic to humans.
Xylene (CAS 1330-20-7)	3 Not classifiable as to carcinogenicity to humans.

US. National Toxicology Program (NTP) Report on Carcinogens

Not available.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	May cause respiratory irritation.
Specific target organ toxicity - repeated exposure	Causes damage to organs (central nervous system, liver, kidneys) through prolonged or repeated exposure.
Aspiration hazard	May be fatal if swallowed and enters airways. If aspirated into lungs during swallowing or vomiting, may cause chemical pneumonia, pulmonary injury or death.
Chronic effects	Causes damage to organs through prolonged or repeated exposure.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Product	Species	Test Results
Zinc-It® Instant Cold Galvanize		
Aquatic		
<i>Acute</i>		
Crustacea	EC50	Daphnia
		0.0934 mg/l, 48 hours estimated
Components		
Species		
Test Results		
Ethylbenzene (CAS 100-41-4)		
Aquatic		
<i>Acute</i>		
Crustacea	EC50	Water flea (Daphnia magna)
		2.1 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)
		12.1 mg/l, 96 hours
Xylene (CAS 1330-20-7)		
Aquatic		
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)
		9.5 - 19.2 mg/l, 96 hours
Zinc, Elemental (CAS 7440-66-6)		
Aquatic		
Fish	LC50	Bony fish superclass (Osteichthyes)
		0.52 - 3.59 mg/l, 96 hours
<i>Acute</i>		
Crustacea	EC50	Water flea (Daphnia magna)
		0.068 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)
		0.482 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)	
Ethylbenzene	3.15
Xylene	3.12 - 3.2
Bioconcentration factor (BCF)	
Xylene	15

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal of waste from residues / unused products If discarded, this product is considered a RCRA ignitable waste, D001. Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose in accordance with all applicable regulations.

Hazardous waste code D001: Waste Flammable material with a flash point <140 F

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN1263
UN proper shipping name	Paint, Limited Quantity
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	III
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	B1, B52, IB3, T2, TP1, TP29
Packaging exceptions	150
Packaging non bulk	173
Packaging bulk	242

IATA

UN number	UN1263
UN proper shipping name	Paint, Limited Quantity
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
ERG Code	3L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	UN1263
UN proper shipping name	PAINT or PAINT RELATED MATERIAL, LIMITED QUANTITY
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
EmS	F-E, S-E
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

SARA 304 Emergency release notification

Not regulated.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Ethylbenzene (CAS 100-41-4)

Xylene (CAS 1330-20-7)

Zinc, Elemental (CAS 7440-66-6)

CERCLA Hazardous Substance List (40 CFR 302.4)

Ethylbenzene (CAS 100-41-4)

Xylene (CAS 1330-20-7)

Zinc, Elemental (CAS 7440-66-6)

CERCLA Hazardous Substances: Reportable quantity

Ethylbenzene (CAS 100-41-4) 1000 LBS

Xylene (CAS 1330-20-7) 100 LBS

Zinc, Elemental (CAS 7440-66-6) 1000 LBS

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center (800-424-8802) and to your Local Emergency Planning Committee.

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Ethylbenzene (CAS 100-41-4)

Xylene (CAS 1330-20-7)

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

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Food and Drug Administration (FDA) Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 Immediate Hazard - Yes

Hazard categories Delayed Hazard - Yes

Fire Hazard - Yes

Pressure Hazard - No

Reactivity Hazard - No

SARA 302 Extremely hazardous substance No

US state regulations

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Ethylbenzene (CAS 100-41-4)

Xylene (CAS 1330-20-7)

Zinc, Elemental (CAS 7440-66-6)

US. Massachusetts RTK - Substance List

Ethylbenzene (CAS 100-41-4)

Xylene (CAS 1330-20-7)

Zinc, Elemental (CAS 7440-66-6)

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. Rhode Island RTK

Ethylbenzene (CAS 100-41-4)

Xylene (CAS 1330-20-7)

Zinc, Elemental (CAS 7440-66-6)

US. New Jersey Worker and Community Right-to-Know Act

Ethylbenzene (CAS 100-41-4)

Xylene (CAS 1330-20-7)

Zinc, Elemental (CAS 7440-66-6)

US. Pennsylvania Worker and Community Right-to-Know Law

Ethylbenzene (CAS 100-41-4)

Xylene (CAS 1330-20-7)

Zinc, Elemental (CAS 7440-66-6)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Ethylbenzene (CAS 100-41-4)

Listed: June 11, 2004

Volatile organic compounds (VOC) regulations

EPA

VOC content (40 CFR 51.100(s)) 20 %

Architectural coatings (40 CFR 59, Subpt. D) Not regulated

State

Architectural coatings Not regulated

VOC content 493.7 g/l

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply 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	08-24-2015
Revision date	01-21-2016
Prepared by	Allison Cho
Version #	02
Further information	Not available.
HMIS® ratings	Health: 2* Flammability: 3 Physical hazard: 1 Personal protection: J
NFPA ratings	Health: 2 Flammability: 3 Instability: 1
NFPA ratings	



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