

Material Safety Data Sheet

Vulcan, Inc.
410 East Berry Avenue
Foley, AL 36535

Phone: 251-943-7000
Fax: 251-943-9270
Prepared: 6/18/03
Updated: 6/6/08

MSDS Date: 6/6/08
Product Name: 5xxx Series Alloys
Manufacturer: Vulcan, Inc.

1. Product and Company Description

Vulcan, Inc.
410 East Berry Avenue
Foley, AL 36535

For Product Information:
251-943-7000

Emergency Phone Number:
1-800-535-5053 INFOTRAC, Inc.
1-251-943-4500 VULCAN ALUMINUM

2. Hazards Identification

Emergency Overview

Appearance/Odor: Solid: sheet, plate, wire, rod, bar, extrusion, forgings, etc. with no odor.

Potential Health Effects:

Acute Eye:

May cause irritation.

Acute Skin:

May cause irritation.

Acute Inhalation:

May cause respiratory tract irritation.

Acute ingestion:

May cause gastrointestinal irritation if swallowed. Aspiration into the lungs may occur during ingestion or vomiting, resulting in lung injury.

Health Effects of Ingredients

Chromium dust Can cause irritation of eyes, skin and respiratory tract. Chromium and trivalent chromium IARC/NTP: Not classified by IARC.

Nickel dust and fumes Can cause irritation of eyes, skin and respiratory tract. Eye contact: Can cause inflammation of the eyes and eyelids (conjunctivitis). Skin contact: Can cause sensitization and allergic contact dermatitis. Chronic overexposures: Can cause perforation of the nasal septum, inflammation of the nasal passages (sinusitis), respiratory sensitization, asthma and scarring of the lungs (pulmonary fibrosis). **Nickel compounds** Associated with lung cancer, cancer of the vocal cords and nasal cancer. IARC/NTP: Listed as "reasonably anticipated to be a

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human carcinogen" by the NTP. Listed as carcinogenic to humans by IARC (Group 1)*. Nickel metal IARC/NTP: Listed as "reasonably anticipated to be a human carcinogen" by the NTP. Listed as possibly carcinogenic to humans by IARC (Group 2B)*.

Manganese dust or fumes Chronic overexposures: Can cause inflammation of the lung tissue, scarring of the lungs (pulmonary fibrosis), central nervous system damage, secondary Parkinson's disease and reproductive harm in males.

Silicon, inert dusts Chronic overexposures: Can cause chronic bronchitis and narrowing of the airways. Additional information: Studies with experimental animals by injection have found lesions on the lungs.

Aluminum dust, fines and fumes Low health risk by inhalation. ACGIH: Listed as nuisance dust (milling, cutting, grinding).

Copper Inhalation: Inhalation of dusts and fumes of metallic copper causes irritation of the upper respiratory tract, congestion of nasal mucous membranes, ulceration and perforation of the nasal septum, and pharyngeal congestion. Inhalation of copper fumes may give rise to metal fume fever (high temperature, metallic taste, nausea, coughing, general weakness, muscle aches, and exhaustion). Ingestion: Copper ingestion causes nausea, vomiting, abdominal pain, metallic taste, and diarrhea. Ingestion of large doses may cause stomach and intestine ulceration, jaundice, and kidney and liver damage. Skin Contact: Causes irritation to skin. Symptoms include redness, itching, and pain. Exposure to copper dust may cause a greenish-black skin discoloration. Eye Contact: Small copper particles in the eyes may cause irritation, discoloration, and damage. Chronic Exposure: Prolonged or repeated exposure to copper can discolor skin and hair and irritate the skin; may cause mild dermatitis, runny nose, and irritation of the mucous membranes. Repeated ingestion may damage the liver and kidneys. Repeated inhalation can cause chronic respiratory disease.

Some products are supplied with a lubricant/oil coating or have residual oil from the manufacturing process. Oil Can cause irritation of skin. Skin contact (prolonged or repeated): Can cause dermatitis. Mineral oils, untreated or mildly refined Studies with experimental animals by skin contact have found skin tumors. IARC/NTP: Listed as "known to be a human carcinogen" by the NTP. Listed as carcinogenic to humans by IARC (Group 1)*.

Health Effects Of Additional Compounds Which May Be Formed During Processing

Hexavalent chromium (Chrome VI) Can cause irritation of eyes, skin and respiratory tract. Skin contact: Can cause irritant dermatitis, allergic reactions and skin ulcers. Chronic overexposures: Can cause perforation of the nasal septum, respiratory sensitization, asthma, fluid in the lungs (pulmonary edema), lung damage, kidney damage, lung cancer, nasal cancer and cancer of the gastrointestinal tract. IARC/NTP: Listed as "known to be a human carcinogen" by the NTP. Listed as carcinogenic to humans by IARC (Group 1)*.

Magnesium oxide fumes Can cause irritation of eyes and respiratory tract. Acute overexposures: Can cause nausea, fever, chills, shortness of breath and malaise (metal fume fever).

Zinc oxide fumes Can cause irritation of upper respiratory tract. Acute overexposures: Can cause nausea, fever, chills, shortness of breath and malaise (metal fume fever). Zinc oxide dust Expected to be a low health risk by inhalation.

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Silica, amorphous Acute overexposures: Can cause dryness of eyes, nose and upper respiratory tract.

Alumina Low health risk by inhalation. ACGIH: Listed as nuisance dust.

If the product is heated well above ambient temperatures or machined, oil vapor or mist may be generated. Oil vapor and mist can cause irritation of respiratory tract. Acute overexposures: Can cause bronchitis, asthma, headache, central nervous system effects (nausea, dizziness and loss of coordination) and drowsiness (narcosis).

Welding, plasma arc cutting, and arc spray metalizing can generate ozone. Ozone can cause irritation of eyes, nose and upper respiratory tract. Acute overexposures: Can cause shortness of breath, tightness of chest, headache, cough, nausea and narrowing of airways. Effects are reversible on cessation of exposure. Acute overexposures (high concentrations): Can cause respiratory distress, respiratory tract damage, bleeding and fluid in the lungs (pulmonary edema). Effects can be delayed up to 1-2 hours. Additional information: Studies with experimental animals by inhalation have found genetic damage, reproductive harm, blood cell damage, lung damage and death.

Welding fumes IARC/NTP: Listed as possibly carcinogenic to humans by IARC (Group 2B)*. Additional Information: In one study, occupational asthma was associated with exposures to fumes from aluminum welding.

Plasma arc cutting can generate oxides of nitrogen. Oxides of nitrogen (NO and NO₂) Can cause irritation of eyes, skin and respiratory tract. Acute overexposures: Can cause reduced ability of the blood to carry oxygen (methemaglobin). Can cause cough, shortness of breath, fluid in the lungs (pulmonary edema) and death. Effects may be delayed up to 2-3 weeks. Nitrogen dioxide (NO₂) Chronic overexposures: Can cause scarring of the lungs (pulmonary fibrosis).

*IARC Classifications

Group 1: The agent is carcinogenic to humans. There is sufficient evidence that a causal relationship existed between exposure to the agent and human cancer.

Group 2B: The agent is possibly carcinogenic to humans. Generally includes agents for which there is limited evidence in the absence of sufficient evidence in experimental animals.

Medical Conditions Aggravated By Exposure to the Product

Asthma, chronic lung disease, and skin rashes.

3. Hazardous Chemical Composition

Component	CAS#	%Composition
Aluminum	7429-90-5	>84.9
Magnesium	7439-95-4	<6.6
Zinc	7440-66-6	<.4
Manganese	7439-96-5	<1.5
Silicon	7440-21-3	<1.1
Chromium	7440-47-3	<0.6

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Nickel	7440-02-0	0-0.05
Copper	7440-50-8	<0.1

4. First Aid Measures

First Aid Measures for Accidental:

Eye Exposure:

Immediately flush eyes with copious amounts of water for a minimum of 15 minutes. Seek immediate medical attention if adverse effect occurs.

Skin Exposure:

Wash skin with soap and water for at least 15 minutes. If irritation develops, SEEK MEDICAL ATTENTION.

Inhalation:

Remove person to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention.

Ingestion:

If the material is swallowed, get immediate medical attention or advice. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do not induce vomiting.

5. Fire Fighting Measures

Fire Hazard Data:

Flammable Properties

This product does not present fire or explosion hazards as shipped. Small chips, turnings, dust and fines from processing may be readily ignitable.

Fire/Explosion

May be a potential hazard under the following conditions:

Dust or fines dispersed in the air can be explosive. Even a minor dust cloud can explode violently.

Chips, dust or fines in contact with water can generate flammable/explosive hydrogen gas. Hydrogen gas could present an explosion hazard in confined or poorly ventilated spaces.

Fines and dust in contact with certain metal oxides (e.g., rust). A thermite reaction, with considerable heat generation, can be initiated by a weak ignition source.

Molten metal in contact with water/moisture or other metal oxides (e.g., rust). Moisture entrapped by molten metal can be explosive. Contact of molten aluminum with other metal oxides can initiate a thermite reaction.

Extinguishing Media:

Use Class D extinguishing agents on dusts, fines or molten metal. Use coarse water spray on chips and turnings.

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Special Fire Fighting Procedures:

Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

Unusual Fire and Explosion Hazards:

None.

6. Accidental Release Measures

Cleanup and Disposal of Spill:

If molten: Contain the flow using dry sand or salt flux as a dam. Do not use shovels or hand tools to halt the flow of molten aluminum. Allow the spill to cool before re-melting as scrap. Discard any product, residue, disposable container or liner in full compliance with federal, state, and local regulations.

7. Handling and Storage

Handling/Storage:

Product should be kept dry. Avoid generating dust. Avoid contact with sharp edges or heated metal. Hot and cold aluminum are not visually different.

Requirements for Processes Which Generate Dusts or Fumes

If processing of these products includes operations where dust or extremely fine particulate is generated, obtain and follow the safety procedures and equipment guides contained in Aluminum Association Bulletin F-1 and National Fire Protection Association (NFPA) brochures listed in Section 16. Cover and reseal partially empty containers. Use non-sparking handling equipment. Provide grounding and bonding where necessary to prevent accumulation of static charges during dust handling and transfer operations (See Section 15). Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic precipitators must not be used. Dust collection systems must be dedicated to aluminum dust only and should be clearly labeled as such. Do not co-mingle fines of aluminum with fines of iron, iron oxide (rust) or other metal oxides. Do not allow chips, fines or dust to contact water, particularly in enclosed areas. Avoid all ignition sources. Good housekeeping practices must be maintained.

Requirements for Re-melting of Scrap Material and/or Ingot

Molten metal and water can be an explosive combination. The risk is greatest when there is sufficient molten metal to entrap or seal off the water. Water and other forms of contamination on or contained in scrap or re-melt ingot are known to have caused explosions in melting operations. While the products may have minimal surface roughness and internal voids, there remains the possibility of moisture contamination or entrapment. If confined, even a few drops of water can lead to violent explosions. All tooling and containers which come in contact with molten metal must be preheated or specially coated and rust free. Molds and ladles must be preheated or oiled prior to casting. Any surfaces that may contact molten metal (e.g., concrete) should be specially coated. Drops of molten metal in water (e.g. from plasma arc cutting), while not normally an explosion hazard, can generate enough flammable hydrogen gas to present an explosion hazard. Vigorous circulation of the water and removal of the particles minimize the hazards.

During melting operations, the following minimum guidelines should be observed:

- Inspect all materials prior to furnace charging and completely remove surface contamination such as water, ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage.

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- Store materials in dry, heated areas with any cracks or cavities pointed downwards.
- Preheat and dry large or heavy items such as ingot adequately before charging into a furnace containing molten metal. This is typically done by use of a drying oven or homogenizing furnace. The drying cycle should bring the internal metal temperature of the coldest item of the batch to 400°F and then hold at that temperature for 6 hours.

8. Exposure Controls / Personal Protection

Exposure Guidelines:

Aluminum (7429-90-5)

ACGIH: 1 mg/m³ TWA (respirable fraction)
OSHA: 15 mg/m³ TWA (total dust); 5 mg/m³ TWA (respirable fraction)
NIOSH: 10 mg/m³ TWA (total dust); 5 mg/m³ TWA (respirable dust)

Manganese (7439-96-5)

ACGIH: 0.2 mg/m³ TWA
OSHA: 1 mg/m³ TWA (fume)
3 mg/m³ STEL (fume)
5 mg/m³ Ceiling
NIOSH: 1 mg/m³ TWA (fume)
3 mg/m³ STEL

Silicon (7440-21-3)

OSHA: 10 mg/m³ TWA (total dust); 5 mg/m³ TWA (respirable fraction)
NIOSH: 10 mg/m³ TWA (total dust); 5 mg/m³ TWA (respirable dust)

Chromium (7440-47-3)

ACGIH: 0.5 mg/m³ TWA
OSHA: 1 mg/m³ TWA
NIOSH: 0.5 mg/m³ TWA

Copper (7440-50-8)

ACGIH: 0.2 mg/m³ TWA (fume); 1 mg/m³ TWA (dust and mist, as Cu)
OSHA: 0.1 mg/m³ TWA (dust, fume, mists, as Cu)
NIOSH: 1 mg/m³ TWA (dust and mist)

Nickel (7440-02-0)

ACGIH: 1.5 mg/m³ TWA (inhalable fraction)
OSHA: 1 mg/m³ TWA
NIOSH: 0.015 mg/m³ TWA

Additional Compounds Which May be Formed During Processing

Alumina (non-fibrous) (1344-28-1)

ACGIH as Al: 10 mg/m³ TWA (The value is for total dust containing no asbestos and < 1% crystalline silica)
OSHA 15 mg/m³ TWA (total dust); 5 mg/m³ TWA (respirable fraction)

Magnesium oxide fume (1309-48-4)

ACGIH 10 mg/m³ TWA
OSHA total particulate: 15 mg/m³ TWA

Zinc oxide (1314-13-2)

ACGIH fume: 5 mg/m³ TWA; dust: 10 mg/m³ TWA (The value for Zinc oxide 'dust' is for total dust containing no asbestos and < 1% crystalline silica)
ACGIH fume: 10 mg/m³ STEL

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OSHA 5 mg/m³ TWA (fume); 15 mg/m³ TWA (total dust); 5 mg/m³ TWA (respirable fraction)

Manganese inorganic compounds (Not Available)

ACGIH as Mn; 0.2 mg/m³ TWA

OSHA C 5 mg/m³ (as Mn)

Silica fume (amorphous) (69012-64-2)

ACGIH 2 mg/m³ TWA (This value is for the respirable fraction of the silica fume)

Nickel insoluble compounds (Not Available)

ACGIH as Ni, inhalable fraction: 0.2 mg/m³ TWA

OSHA 1 mg/m³ TWA (as Ni)

Chromium (II) compounds (Not Available)

OSHA 0.5 mg/m³ TWA (as Cr)

Chromium (III) compounds (as Cr) (Not Available)

ACGIH as Cr: 0.5 mg/m³ TWA

Chromium (VI) compounds- water soluble (Not Available)

ACGIH 0.05 mg/m³ TWA

Chromium (VI) compounds (certain water insoluble forms) (Not Available)

ACGIH 0.01 mg/m³ TWA

Chromic acid and chromates (7738-94-5)

OSHA and chromates: C 1 mg/10m³

Oil mist, mineral (8012-95-1)

ACGIH 5 mg/m³ TWA (as sampled by a method that does not collect vapor)

ACGIH (10) mg/m³ STEL (as sampled by a method that does not collect vapor)

OSHA 5 mg/m³ TWA

Welding fumes (NOC) (Not Available)

ACGIH 5 mg/m³ TWA

Ozone (10028-15-6)

ACGIH Heavy work: 0.05 ppm TWA; Moderate work: 0.08 ppm TWA; Light work: 0.1 ppm TWA; heavy, moderate or light work, <= 2Hrs: 0.20 ppm

OSHA 0.1 ppm TWA; 0.2 mg/m³ TWA

Nitrogen dioxide (10102-44-0)

ACGIH 3 ppm TWA

ACGIH 5 ppm STEL

OSHA C 5 ppm; C 9 mg/m³

Nitric oxide (10102-43-9)

ACGIH 25 ppm TWA

OSHA 25 ppm TWA; 30 mg/m³ TWA

Engineering Controls:

Ventilation must be adequate to maintain the ambient workplace atmosphere below the exposure limit(s) outlined in the MSDS.

Respiratory Protection:

If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces.

Eye / Face Protection:

Wear safety glasses/goggles to avoid eye contact.

Skin Protection:

Wear impervious gloves to avoid repeated or prolonged skin contact with residual oils and to avoid any skin injury.

General

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Personnel who handle and work with **molten metal** should utilize primary protective clothing like face shields, fire resistant tapper's jackets, leggings, spats and similar equipment to prevent burn injuries. In addition to primary protection, secondary or day-to-day work clothing that is fire resistant and sheds metal splash is recommended for use with molten metal.

Minimize breathing **oil vapors and mist**. Remove oil contaminated clothing; launder or dry-clean before reuse. Remove oil contaminated shoes and thoroughly clean and dry before reuse. Cleanse skin thoroughly after contact, before breaks and meals, and at the end of the work period. Oil coating is readily removed from skin with waterless hand cleaners followed by a thorough washing with soap and water.

9. Physical and Chemical Properties

Physical Appearance: Silvery Solid: sheet, plate, wire, rod, bar, extrusion, forgings, etc.

Odor: None

pH: NA

Specific Gravity/Density: Range: generally 2.64-2.72 g/cm³ (0.095-0.098 lb/in³)

Water Solubility: None

Melting Point: Range: generally 1050-1220°F (566-660°C)

Freezing Point ND

Boiling Point: NA

Vapor Pressure: ND

Percent Volatiles by Volume: ND

Evaporation Rate: ND

Flash Point: NA

Explosion Limits: Lower: NA

Upper: NA

Autoignition Temp: ND

10. Stability and Reactivity

Chemical Stability:

Stable

Conditions to Avoid:

Chips, fines, dust and molten metal are considerably more reactive with the following:

- Water: Slowly generates flammable/explosive hydrogen gas and heat. Generation rate is greatly increased with smaller particles (e.g., fines and dusts). Molten metal can react violently/explosively with water or moisture, particularly when the water is entrapped.
- Heat: Oxidizes at a rate dependent upon temperature and particle size.
- Strong oxidizers: Violent reaction with considerable heat generation. Can react explosively with nitrates (e.g., ammonium nitrate and fertilizers containing nitrate) particularly when heated or molten.
- Acids and alkalis: Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles (e.g., fines and dusts).
- Halogenated compounds: Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided aluminum.
- Iron oxide (rust) and other metal oxides (e.g., copper and lead oxides): A violent thermite reaction generating considerable heat can occur. Reaction with aluminum fines and dusts requires only very weak ignition sources for initiation. Molten aluminum can react violently with iron oxide without external ignition source.

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- Iron powder and water: An explosive reaction forming hydrogen gas occurs when heated above 1470°F (800°C).

Hazardous Polymerization:

Will not occur.

11. Toxicological Information

Acute Effects

Magnesium (7439-95-4)
Oral LD50 Rat: 230 mg/kg

Manganese (7439-96-5)
Oral LD50 Rat: 9 g/kg

Silicon (7440-21-3)
Oral LD50 Rat: 3160 mg/kg

Nickel (7440-02-0)
Oral LD50 Rat: >9000 mg/kg

Chronic Effects

Carcinogenicity:

Aluminum (7429-90-5)
ACGIH: A4 - Not Classifiable as a Human Carcinogen

Chromium (7440-47-3)
ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Monograph 49 [1990] (listed under Chromium and Chromium compounds), Supplement 7 [1987] (Group 3 (not classifiable))

Nickel (7440-02-0)
ACGIH: A5 - Not Suspected as a Human Carcinogen
NIOSH: potential occupational carcinogen
NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)
IARC: Monograph 49 [1990], Supplement 7 [1987] (Group 2B (possibly carcinogenic to humans))

12. Ecological Information

Environmental Fate:

Zinc (7440-66-6)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	6.4 mg/L
96 Hr EC50 Selenastrum capricornutum	30 µg/L
72 Hr EC50 water flea	5 µg/L

Copper (7440-50-8)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	23 µg/L

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96 Hr LC50 Oncorhynchus mykiss	13.8 µg/L
96 Hr LC50 Lepomis macrochirus	236 µg/L
72 Hr EC50 Scenedesmus subspicatus	120 µg/L
96 Hr EC50 water flea	10 µg/L
96 Hr EC50 water flea	200 µg/L

Nickel (7440-02-0)

Test & Species		Conditions
96 Hr LC50 Oncorhynchus mykiss	31.7 mg/L	adult
96 Hr LC50 Pimephales promelas	3.1 mg/L	
96 Hr LC50 Brachydanio rerio	>100 mg/L	
72 Hr EC50 freshwater algae (4 species)	0.1 mg/L	
72 Hr EC50 Selenastrum capricornutum	0.18 mg/L	
96 Hr EC50 water flea	510 µg/L	

Environmental Toxicity:

Not Determined

13. Disposal Considerations

Waste Disposal Method:

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transportation Information

US Department of Transportation Shipping Name:

US Department of Transportation	Proper Shipping Name	Not Regulated
	Hazard Class	Not Regulated
	ID Number	Not Regulated
	Packing Group	Not Regulated

15. Regulatory Information

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Aluminum (7429-90-5)

SARA 313: 1.0 % de minimis concentration (dust or fume only)

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Manganese (7439-96-5)

SARA 313: 1.0 % de minimis concentration

Chromium (7440-47-3)

CERCLA: 5000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 2270 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers)

Zinc (7440-66-6)

CERCLA: 1000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 454 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the solid metal released is larger than 100 micrometers)

Copper (7440-50-8)

CERCLA: 5000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 2270 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers)

Nickel (7440-02-0)

CERCLA: 100 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers); 45.4 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers)

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Aluminum	7429-90-5	Yes	Yes	Yes	Yes	Yes	Yes
Magnesium	7439-95-4	Yes	Yes	No	Yes	Yes	Yes
Manganese	7439-96-5	Yes	Yes	Yes	Yes	Yes	Yes
Silicon	7440-21-3	No	Yes	Yes	Yes	Yes	Yes
Chromium	7440-47-3	Yes	Yes	Yes	Yes	Yes	Yes
Zinc	7440-66-6	Yes	Yes	No	Yes	Yes	Yes
Copper	7440-50-8	Yes	Yes	Yes	Yes	Yes	Yes
Nickel	7440-02-0	Yes	Yes	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

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Component Analysis - Inventory

Component	CAS #	TSCA
Aluminum	7429-90-5	Yes
Magnesium	7439-95-4	Yes
Manganese	7439-96-5	Yes
Silicon	7440-21-3	Yes
Chromium	7440-47-3	Yes
Zinc	7440-66-6	Yes
Copper	7440-50-8	Yes
Nickel	7440-02-0	Yes

16. Other Information

MSDS History

Original: June 18, 2003

Supersedes:

Revised:

MSDS Status

N/A

Prepared By

Vulcan, Inc.

Other Information

- Aluminum Association's Bulletin F-1, "Guidelines for Handling Aluminum Fines Generated During Various Aluminum Fabricating Operations." The Aluminum Association, 900 19th Street, N.W., Washington, DC 20006.
- Aluminum Association, "Guidelines for Handling Molten Aluminum, The Aluminum Association, 900 19th Street, N.W., Washington, DC 20006.
- NFPA 65, Standard for Processing and Finishing of Aluminum (NFPA phone: 800-344-3555)
- NFPA 651, Standard for Manufacture of Aluminum and Magnesium Powder
- NFPA 70, Standard for National Electrical Code (Electrical Equipment, Grounding and Bonding)
- NFPA 77, Standard for Static Electricity
- Guide to Occupational Exposure Values-1999, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
- Documentation of the Threshold Limit Values and Biological Exposure Indices, Sixth Edition, 1991, Compiled by the American Conference of Governmental Industrial Hygienists, Inc. (ACGIH).
- NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, June 1994.
- Dangerous Properties of Industrial Materials, Sax, N. Irving, Van Nostrand Reinhold Co., Inc., 1984.
- Patty's Industrial Hygiene and Toxicology: Volume II: Toxicology, 4th ed., 1994, Patty, F. A.; edited by Clayton, G. D. and Clayton, F. E.: New York: John Wiley & Sons, Inc.
- TOMES CPS(TM), MICROMEDEX, Inc., 1999

Key Legend Information:

ACGIH American Conference of Governmental Industrial Hygienists
AICS Australian Inventory of Chemical Substances
CAS Chemical Abstract Service
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act
CFR Code of Federal Regulations
CPR Cardio-pulmonary Resuscitation

DOT Department of Transportation
DSL Domestic Substances List (Canada)
EINECS European Inventory of Existing Commercial Chemical Substances
EPA Environmental Protection Act
IARC International Agency for Research on Cancer
LC₅₀ Lethal concentration (50 percent kill)
LC_{Lo} Lowest published lethal concentration
LD₅₀ Lethal dose (50 percent kill)

Material Safety Data Sheet

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LD ₅₀ Lowest published lethal dose	UFL Upper Flammable Limit
LFL Lower Flammable Limit	atm atmosphere
MITI Ministry of International Trade & Industry	cm centimeter
NFPA National Fire Protection Association	g, gm gram
NIOSH National Institute for Occupational Safety and Health	in inch
NTP National Toxicology Program	kg kilogram
OEL Occupational Exposure Limit	lb pound
OSHA Occupational Safety and Health Administration	m meter
PEL Permissible Exposure Limit	mg milligram
PIN Product Identification Number	ml, ML milliliter
RCRA Resource Conservation and Recovery Act	mm millimeter
SARA Superfund Amendments and Reauthorization Act	mppcf million particles per cubic foot
STEL Short Term Exposure Limit	n.o.s. not otherwise specified
TCLP Toxic Chemicals Leachate Program	ppb parts per billion
TDG Transportation of Dangerous Goods	ppm parts per million
TLV Threshold Limit Value	psia pounds per square inch absolute
TSCA Toxic Substance Control Act	u micron
TWA Time Weighted Average	ug microgram

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