STAINLESS STEEL

APRIL 2019 • SDS# 002

* * * Section 1 - Product and Company Identification * * *

Material Name: Stainless Steels
Common Alloy/Grade: Bar, Sheet, Plate, Tubing, Pipe and Structurals
Recommended Use: Solid product, various forms and uses

Manufacturer's Name: Refractory Anchors, Inc.
9836 S. 219th E. Ave.
Broken Arrow, OK 74014
Emergency Numbers: 918-455-8485 or 800-331-3270

* * * Section 2 - Hazards Identification * * *

General Hazard Statement: Solid metallic products are generally classified as "articles" and do not constitute a hazardous materials in solid form under the definitions of the OSHA Hazard Communication Standard (29 CFR 1910.1200). Any articles manufactured from these solid products would be generally classified as non-hazardous. However some hazardous elements contained in these products can be emitted under certain processing conditions such as but not limited to: burning, melting, cutting, sawing, brazing, grinding, machining, milling, and welding. Products in the solid state present no fire or explosion hazard. Small chips, fines, and dust may ignite readily, though. The following classification information is for the hazardous elements which may be released during processing.

GHS Classification:

Flammable Solid – Category 1
Eye Damage/Irritation - Category 2B
Respiratory Sensitizer - Category 1
Skin Sensitizer - Category 1
Germ Cell Mutagenicity - Category 2
Carcinogenicity - Category 1B
Toxic to Reproduction - Category 1B
Specific Target Organ Toxicity (Repeated Exposure) - Category 1
Hazardous to the Aquatic Environment - Acute Hazard - Category 1

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

Danger

Hazard Statements

Flammable solid.
Causes eye irritation.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause an allergic skin reaction.
Suspected of causing genetic defects.
May cause cancer.
May damage fertility or the unborn child.
Causes damage to respiratory system through prolonged or repeated exposure.

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Very toxic to aquatic life.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Use explosion proof electrical/ventilating/lighting equipment.
Wear protective gloves/protective clothing/eye protection/face protection.
Do not breathe dust/fume.
In case of inadequate ventilation wear respiratory protection
Contaminated work clothing should not be allowed out of the workplace.
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Avoid release to the environment

Response

In case of fire: Use Class D agent to extinguish.
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: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms: Call a poison center/doctor.
IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention.
Wash contaminated clothing before reuse.
If exposed or concerned: Get medical advice/attention.
Get medical advice/attention if you feel unwell.
Collect spillage.

Storage

Store locked up

Disposal

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

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
7439-89-6	Iron	45-90
7440-02-0	Nickel	0-46
7440-47-3	Chromium	10-30
7439-96-5	Manganese	0-15
7440-21-3	Silicon	0-9.5
7439-98-7	Molybdenum	0-7
7440-48-4	Cobalt	0-5
7440-50-8	Copper	0-5
7440-33-7	Tungsten	0-4
7429-90-5	Aluminum	0-4
7440-32-6	Titanium	0-2.4
7440-44-0	Carbon	0.01-2.0
7440-62-2	Vanadium	0-1.1
7440-25-7	Tantalum	0-1
7440-03-1	Niobium	0-1
7439-92-1	Lead	<0.1
8012-95-1	Oil mist, mineral	<0.1
7727-37-9	Nitrogen	0.01-0.06
7704-34-9	Sulfur	0.01-0.06

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The above listing is a summary of elements used in alloying stainless steels. Various grades will contain different combinations of these elements. Other trace elements may also be present in minute amounts. These small quantities (less than 0.1%), frequently referred to as "trace" or "residual" elements, generally originate in the raw material used. Values shown are applicable to component elements.

*Stainless steel products as provided contain chromium metal in the zero valence state. As such, chromium metal does not present any unusual health hazard. However, welding, torch cutting, brazing, or perhaps grinding of chromium metal in stainless steel may generate airborne concentration of hexavalent chromium. The roll may have a light coating of oil to prevent corrosion.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. Consult a physician.

First Aid: Skin

Wash skin with soap and water. In the case of skin irritation or allergic reactions see a physician.

First Aid: Ingestion

Do NOT induce vomiting. Call a physician or Poison Control Center immediately. Drink plenty of water. Never give anything by mouth to an unconscious person.

First Aid: Inhalation

Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Consult a physician.

First Aid: Notes to Physician

May cause sensitization of susceptible persons. Treat symptomatically.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.
This product does not present fire or explosion hazards as shipped. Small chips, fines, and dust from processing may be readily ignitable.

Hazardous Combustion Products

Thermal decomposition can lead to release of irritating gases and vapors. In the event of fire and/or explosion do not breathe fumes. May cause sensitization by inhalation and skin contact.

Extinguishing Media

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

Unsuitable Extinguishing Media

DO NOT use halogenated extinguishing agents on small chips or fines. DO NOT use water for fires involving molten metal. These fire extinguishing agents will react with burning material.

Fire Fighting Equipment/Instructions

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

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Avoid dust formation. Collect scrap for recycling.

Materials and Methods for Clean-Up

If product is molten, contain the flow using dry sand or salt flux as a dam. All tools and containers which come in contact with molten metal must be preheated or specially coated and rust free. Allow the spill to cool before remelting as scrap.

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Emergency Measures
Keep people away from and upwind of spill/leak.

Personal Precautions and Protective Equipment
Wear appropriate protective clothing and respiratory protection for the situation.

Environmental Precautions
Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not flush into surface water or sanitary sewer system.

Prevention of Secondary Hazards
None

* * * Section 7 - Handling and Storage * * *

Handling Procedures
Avoid contact with skin, eyes and clothing. Wear personal protective equipment. Avoid dust formation. Keep material dry. Avoid contact with sharp edges or heated material. Hot and cold aluminum are not visually different. Hot aluminum does not always glow red.

Storage Procedures
Keep container tightly closed in a dry and well-ventilated place.

Incompatibilities
Acids. Alkalis. Water. Halogenated compounds. Metal oxides. Iron powder and water: may cause an explosive reaction forming hydrogen gas when heated above 1470F (800C).

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

Nickel (7440-02-0)
ACGIH: 1.5 mg/m3 TWA (inhalable fraction)
OSHA: 1 mg/m3 TWA
NIOSH: 0.015 mg/m3 TWA

Chromium (7440-47-3)
ACGIH: 0.5 mg/m3 TWA
OSHA: 1 mg/m3 TWA
NIOSH: 0.5 mg/m3 TWA

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)

Molybdenum (7439-98-7)
ACGIH: 10 mg/m3 TWA (inhalable fraction); 3 mg/m3 TWA (respirable fraction)
OSHA: 10 mg/m3 TWA

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Cobalt (7440-48-4)
ACGIH: 0.02 mg/m3 TWA
OSHA: 0.05 mg/m3 TWA (dust and fume)
NIOSH: 0.05 mg/m3 TWA (dust and fume)

Copper (7440-50-8)
ACGIH: 0.2 mg/m3 TWA (fume)
OSHA: 0.1 mg/m3 TWA (dust, fume, mist, as Cu)
NIOSH: 1 mg/m3 TWA (dust and mist); 0.1 mg/m3 TWA (fume)

Tungsten (7440-33-7)
ACGIH: 5 mg/m3 TWA
10 mg/m3 STEL
OSHA: 5 mg/m3 TWA
10 mg/m3 STEL
NIOSH: 5 mg/m3 TWA
10 mg/m3 STEL

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)

Vanadium (7440-62-2)
OSHA: 0.05 mg/m3 TWA (respirable dust, as V2O5); 0.05 mg/m3 TWA (fume, as V2O5)
NIOSH: 1 mg/m3 TWA (listed under Ferrovanadium dust)
3 mg/m3 STEL (listed under Ferrovanadium dust)

Tantalum (7440-25-7)
OSHA: 5 mg/m3 TWA
NIOSH: 5 mg/m3 TWA (dust)
10 mg/m3 STEL (dust)

Lead (7439-92-1)
ACGIH: 0.05 mg/m3 TWA
OSHA: 30 µg/m3 Action Level (Poison, See 29 CFR 1910.1025); 50 µg/m3 TWA
NIOSH: 0.050 mg/m3 TWA

Oil mist, mineral (8012-95-1)
ACGIH: 5 mg/m3 TWA (excluding metal working fluids, highly & severely refined, inhalable fraction)
OSHA: 5 mg/m3 TWA
NIOSH: 5 mg/m3 TWA
10 mg/m3 STEL

Engineering Measures

Where feasible, enclose processes to prevent dust dispersion into the work area. Provide local exhaust when possible, and general ventilation as necessary, to keep airborne concentrations below exposure limits and as low as possible.

Personal Protective Equipment: Respiratory

If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA 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.

Personal Protective Equipment: Hands

Use impervious gloves such as neoprene, nitrile, or rubber for hand protection.

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Personal Protective Equipment: Eyes

Wear safety glasses with side shields and/or goggles as necessary to prevent dust from entering eyes.

Personal Protective Equipment: Skin and Body

Use body protection appropriate for task.

Hygiene Measures

Do not breathe vapors/dust. When using, do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Silver, Metallic	**Odor:**	None
Physical State:	Solid	**pH:**	NA
Vapor Pressure:	ND	**Vapor Density:**	ND
Boiling Point:	ND	**Melting Point:**	ND
Solubility (H2O):	Insoluble	**Specific Gravity:**	ND
Evaporation Rate:	ND	**VOC:**	ND
Octanol/H2O Coeff.:	ND	**Flash Point:**	NA
Flash Point Method:	NA	**Upper Flammability Limit (UFL):**	NA
Lower Flammability Limit (LFL):	NA	**Burning Rate:**	NA
Auto Ignition:	NA		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

Stable under recommended storage conditions.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Dust formation. Heat, flames and sparks.

Incompatible Products

Acids. Alkalis. Water. Halogenated compounds. Metal oxides. Iron powder and water: may cause an explosive reaction forming hydrogen gas when heated above 1470F (800C).

Hazardous Decomposition Products

Nickel oxides. Cadmium compounds. Cobalt oxides. Manganese. Lead and chromium compounds. Welding of aluminum alloys may generate carbon monoxide, carbon dioxide, ozone, and nitrogen oxides.

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

Component Analysis - LD50/LC50

Iron (7439-89-6)
Oral LD50 Rat 984 mg/kg

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

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

Silicon (7440-21-3)

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Oral LD50 Rat 3160 mg/kg

Cobalt (7440-48-4)
Inhalation LC50 Rat >10 mg/L 1 h; Oral LD50 Rat 6170 mg/kg

Carbon (7440-44-0)
Oral LD50 Rat >10000 mg/kg

Oil mist, mineral (8012-95-1)
Oral LD50 Mouse 22 g/kg

Sulfur (7704-34-9)
Inhalation LC50 Rat >9.23 mg/L 4 h; Oral LD50 Rat >3000 mg/kg; Dermal LD50 Rabbit >2000 mg/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Contact with dust can cause mechanical irritation or drying of the skin. Contact with oils from processing may cause irritation. Prolonged skin contact may defat the skin and produce dermatitis. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Dust contact with the eyes can lead to mechanical irritation.

Potential Health Effects: Ingestion

May be harmful if swallowed. May cause additional affects as listed under "Inhalation".

Potential Health Effects: Inhalation

May be harmful if inhaled. Inhalation of dust in high concentration may cause irritation of respiratory system.

Respiratory Organs Sensitization/Skin Sensitization

May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction.

Generative Cell Mutagenicity

Suspected of causing genetic defects

Carcinogenicity

A: General Product Information

May cause cancer.

B: Component Carcinogenicity

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))

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))

Cobalt (7440-48-4)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 86 [2006] (without tungsten carbide); Monograph 52 [1991] (Group 2B (possibly carcinogenic to humans))

Aluminum (7429-90-5)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

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Lead (7439-92-1)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
OSHA: 30 µg/m3 Action Level (Poison, See 29 CFR 1910.1025); 50 µg/m3 TWA
NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)
IARC: Monograph 87 [2006] (evaluates inorganic lead compounds as Group 2A and organic lead compounds as Group 3) (Group 2A (probably carcinogenic to humans))

Oil mist, mineral (8012-95-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen (highly & severely refined); A2 - Suspected Human Carcinogen (poorly & mildly refined)

Reproductive Toxicity

Lead may damage the reproductive system and cause developmental damage.

Specified Target Organ General Toxicity: Single Exposure

Causes damage to organs (kidneys, respiratory system)

Specified Target Organ General Toxicity: Repeated Exposure

May cause damage to organs through prolonged or repeated exposure (respiratory system). Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure. Prolonged exposure may cause chronic effects. Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemaglobinemia. May also cause pulmonary fibrosis and lung cancer. Lead compounds may be absorbed by ingestion, by inhalation and through the skin. Lead may damage kidney function, the blood forming system and the reproductive system. Inorganic lead compounds can cause developmental damage.

Aspiration Respiratory Organs Hazard

None

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Very toxic to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Iron (7439-89-6)

Test & Species		Conditions
96 Hr LC50 Morone saxatilis	13.6 mg/L [static]	
96 Hr LC50 Cyprinus carpio	0.56 mg/L [semi-static]	

Nickel (7440-02-0)

Test & Species		Conditions
96 Hr LC50 Brachydanio rerio	>100 mg/L	
96 Hr LC50 Cyprinus carpio	1.3 mg/L [semi-static]	
96 Hr LC50 Cyprinus carpio	10.4 mg/L [static]	
72 Hr EC50 Pseudokirchneriella subcapitata	0.18 mg/L	
96 Hr EC50 Pseudokirchneriella subcapitata	0.174 - 0.311 mg/L [static]	
48 Hr EC50 Daphnia magna	>100 mg/L	
48 Hr EC50 Daphnia magna	1 mg/L [Static]	

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Cobalt (7440-48-4)

Test & Species		Conditions
96 Hr LC50 Brachydanio rerio	>100 mg/L [static]	

Copper (7440-50-8)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	0.0068 - 0.0156 mg/L	
96 Hr LC50 Pimephales promelas	<0.3 mg/L [static]	
96 Hr LC50 Pimephales promelas	0.2 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	0.052 mg/L [flow-through]	
96 Hr LC50 Lepomis macrochirus	1.25 mg/L [static]	
96 Hr LC50 Cyprinus carpio	0.3 mg/L [semi-static]	
96 Hr LC50 Cyprinus carpio	0.8 mg/L [static]	
96 Hr LC50 Poecilia reticulata	0.112 mg/L [flow-through]	
72 Hr EC50 Pseudokirchneriella subcapitata	0.0426 - 0.0535 mg/L [static]	
96 Hr EC50 Pseudokirchneriella subcapitata	0.031 - 0.054 mg/L [static]	
48 Hr EC50 Daphnia magna	0.03 mg/L [Static]	

Lead (7439-92-1)

Test & Species		Conditions
96 Hr LC50 Cyprinus carpio	0.44 mg/L [semi-static]	
96 Hr LC50 Oncorhynchus mykiss	1.17 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	1.32 mg/L [static]	
48 Hr EC50 water flea	600 µg/L	

Sulfur (7704-34-9)

Test & Species		Conditions
96 Hr LC50 Brachydanio rerio	866 mg/L [static]	
96 Hr LC50 Lepomis macrochirus	<14 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	>180 mg/L [static]	

Persistence/Degradability

Metal powders may cause ecological damage through silting or sedimentation effect in water depriving organisms of habitat and mobility, and/or fouling of gills, lungs and skin thus limiting oxygen uptake.

Bioaccumulation

Metal powders in water or soil may form metal oxides or other metal compounds that could become bioavailable and harm aquatic or terrestrial organisms.

Mobility in Soil

Metal powder would be relatively immobile in soils but some metal compounds may be transported with ground water.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

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Disposal of Contaminated Containers or Packaging

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

* * * Section 14 - Transportation Information * * *

Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Copper	7440-50-8	DOT regulated severe marine pollutant (powder)

DOT Information

Shipping Name: Not Regulated

IATA Information

Shipping Name: Not Regulated

ICAO Information

Shipping Name: Not Regulated

IMDG Information

Shipping Name: Not Regulated

* * * Section 15 - Regulatory Information * * *

Regulatory Information

US Federal Regulations

A: 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).

Nickel (7440-02-0)

SARA 313: 0.1 % de minimis concentration

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 >100 μm); 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 >100 μm)

Chromium (7440-47-3)

SARA 313: 1.0 % de minimis concentration

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 >100 μm); 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 >100 μm)

Manganese (7439-96-5)

SARA 313: 1.0 % de minimis concentration

Cobalt (7440-48-4)

SARA 313: 0.1 % de minimis concentration

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Copper (7440-50-8)

SARA 313: 1.0 % de minimis concentration

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 >100 μm); 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 >100 μm)

Aluminum (7429-90-5)

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

Lead (7439-92-1)

CERCLA: 10 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 >100 μm); 4.54 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 >100 μm)

B: Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Copper (7440-50-8)

0-5 DOT regulated severe marine pollutant (powder)

State Regulations

A: 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
Iron	7439-89-6	Yes	No	No	No	No	No
Nickel	7440-02-0	Yes	Yes	Yes	Yes	Yes	Yes
Chromium	7440-47-3	Yes	Yes	Yes	Yes	Yes	Yes
Manganese	7439-96-5	Yes	Yes	Yes	Yes	Yes	Yes
Silicon	7440-21-3	No	Yes	Yes	Yes	Yes	Yes
Molybdenum	7439-98-7	Yes	Yes	Yes	Yes	Yes	Yes
Cobalt	7440-48-4	Yes	Yes	Yes	Yes	Yes	Yes
Copper	7440-50-8	Yes	Yes	Yes	Yes	Yes	Yes
Tungsten	7440-33-7	Yes	Yes	Yes	Yes	Yes	Yes
Aluminum	7429-90-5	Yes	Yes	Yes	Yes	Yes	Yes
Titanium	7440-32-6	Yes	No	No	Yes	No	No
Carbon	7440-44-0	No	No	No	No	No	Yes
Vanadium	7440-62-2	Yes	Yes	No	Yes	Yes	No
Tantalum	7440-25-7	Yes	Yes	Yes	Yes	Yes	Yes
Lead	7439-92-1	Yes	Yes	Yes	Yes	Yes	No
Oil mist, mineral	8012-95-1	Yes	Yes	Yes	Yes	Yes	Yes
Nitrogen	7727-37-9	No	Yes	Yes	Yes	Yes	Yes
Sulfur	7704-34-9	Yes	Yes	No	Yes	Yes	Yes

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

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

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Component	CAS #	Minimum Concentration
Nickel	7440-02-0	0.1 %
Chromium	7440-47-3	0.1 %
Manganese	7439-96-5	1 %
Molybdenum	7439-98-7	1 %
Cobalt	7440-48-4	0.1 %
Copper	7440-50-8	1 %
Tungsten	7440-33-7	1 %
Aluminum	7429-90-5	1 %

Additional Regulatory Information

Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Iron	7439-89-6	Yes	DSL	EINECS
Nickel	7440-02-0	Yes	DSL	EINECS
Chromium	7440-47-3	Yes	DSL	EINECS
Manganese	7439-96-5	Yes	DSL	EINECS
Silicon	7440-21-3	Yes	DSL	EINECS
Molybdenum	7439-98-7	Yes	DSL	EINECS
Cobalt	7440-48-4	Yes	DSL	EINECS
Copper	7440-50-8	Yes	DSL	EINECS
Tungsten	7440-33-7	Yes	DSL	EINECS
Aluminum	7429-90-5	Yes	DSL	EINECS
Titanium	7440-32-6	Yes	DSL	EINECS
Carbon	7440-44-0	Yes	DSL	EINECS
Vanadium	7440-62-2	Yes	DSL	EINECS
Tantalum	7440-25-7	Yes	DSL	EINECS
Niobium	7440-03-1	Yes	DSL	EINECS
Lead	7439-92-1	Yes	DSL	EINECS
Oil mist, mineral	8012-95-1	Yes	DSL	EINECS
Nitrogen	7727-37-9	Yes	DSL	EINECS
Sulfur	7704-34-9	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; AS = Standards Australia; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NOHSC = National Occupational Health & Safety Commission; NTP = National Toxicology Program; STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Literature References

Available on request.

End of Sheet