



Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

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

Identification Number: KDS-3

Chemical Name: Aluminum (Minimum 0.1% Nickel)

Product Use: Fabricated Parts

Synonyms: None

Manufacturer Information

Kaiser Aluminum

27422 Portola Parkway

Suite 350

Foothill Ranch, CA 92610

Emergency # CHEMTREC 1-800-424-9300

*** Section 2 - Hazards Identification ***

Emergency Overview

Product is solid metallic pieces. Product may form explosive dust/air mixtures if high concentration of product dust is suspended in air. Firefighters should wear full protective clothing and self-contained breathing apparatus. Exposure to dust may be irritating to eyes, nose, and throat. Contact with hot metal may cause severe thermal burns. Do not touch or handle cast aluminum or heated materials before determining the temperature. Product contains nickel, which can cause skin and lung sensitization and is an identified carcinogen. Hot work operation such as welding, torch cutting, etc may potentially generate hexavalent chromium which has been identified as a carcinogen. See Section 15.

Potential Health Effects: Eyes

Dust, fumes or powder may irritate eye tissue.

Potential Health Effects: Skin

Dust or powder may irritate the skin. Some products may contain residual coating. Prolonged skin contact with the coating oils and nickel component may result in skin sensitization (allergy) in some individuals. Do not touch or handle cast aluminum or heated materials before determining the temperature. Aluminum does not change color on heating. Contact with hot metal may cause severe thermal burns.

Potential Health Effects: Ingestion

Not a likely route of entry. Ingestion of large amounts of dusts or particulates may produce gastrointestinal disturbances including irritation, nausea, and diarrhea.

Potential Health Effects: Inhalation

Dusts of this product may cause irritation of the nose, throat, and respiratory tract. Product contains nickel, which can cause sensitization of the respiratory tract.

Medical Conditions Aggravated by Exposure

Pre-existing skin and lung conditions may be aggravated by exposure to the components of the product. See Section 11.

HMIS Ratings: Health: 1* Fire: 1 Reactivity: 0 Pers. Prot.: Goggles, Gloves

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

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

CAS #	Component	Percent ¹
7429-90-5	Aluminum	80-100
Alloying Elements:		
7440-21-3	Silicon P, W**	0.1-1, 1-5, 5-10, 10-15
7439-89-6	Iron P, W	0.1-1, 1-5

¹ Where more than one range for a component is given in the "Percent" column, the range for the component includes all the individual ranges. Thus, if the column lists 0.1-1, 1-5, 5-10, the material is present in the product at a concentration between 0.1 and 10 percent.

Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

7440-66-6	Zinc P, W	0.1-1, 1-5, 5-10
7440-50-8	Copper P, W	0.1-1, 1-5, 5-10
7439-96-5	Manganese P, W	0.1-1, 1-5
7439-95-4	Magnesium P, W	0.1-1, 1-5, 5-10
7440-69-9	Bismuth P, W	0.1-1, 1-3
7440-31-5	Tin P, W	0.1-1, 1-2
64771-72-8	Coating Oil	0.1-1
7440-02-0	Nickel P, W	0.1-1, 1-5

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Zinc oxide (1314-13-2), Iron oxide (1309-37-1), Magnesium oxide fume (1309-48-4).

Component Information/Information on Non-Hazardous Components

This material is considered hazardous under 29 CFR 1910.1200 (Hazard Communication) and the Canadian Workplace Hazardous Materials Information System (WHMIS). The information in this MSDS is provided for situations where this material may be deformed creating dusts or fumes which may be potentially hazardous.

Coating Oils: Certain products may be coated with residual processing materials which comprise less than 1% of the total product. These can include 111-82-0, 122-39-0, 112-72-1, 124-10-7, 30399-84-9, 64771-72-8, and proprietary corrosion inhibitors. See Section 16 for chemical names. With the exception of 64771-72-8 there are no established or recommended exposure limits.

** (P): Prime ingot hardener aluminum.

(W): Wrought Aluminum (fabricated products).

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

First Aid: Eyes

Flush immediately with water for at least 15 minutes. Do not rub eyes. If irritation persists get medical attention.

First Aid: Skin

For skin contact, flush with large amounts of water. If irritation persists, get medical attention.

First Aid: Ingestion

Due to the physical nature of this material, ingestion is unlikely to occur. If ingestion of a large amount does occur, seek medical attention.

First Aid: Inhalation

If symptoms are experienced, remove source of contamination or move victim to fresh air. Call a physician if symptoms develop or persist.

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

General Fire Hazards

High concentration of airborne dust may form explosive mixture with air. Use adequate ventilation.

Coating oils that may be present on some products can be ignited by open flames and other sources of ignition while the aluminum base product will ignite only under extreme conditions.

Hazardous Combustion Products

Decomposition of base metal product may yield metallic oxides.

Decomposition of coating oils present on some products will release carbon monoxide, carbon dioxide, and other hydrocarbon species.

Extinguishing Media

Use dry chemical, foam, carbon dioxide, water spray or water fog for oil fires.

Use dry powder, talc, or sand to extinguish metal fires.

Material in or near fires should be cooled with a water spray or fog if compatible with fire fighting techniques for the other materials involved in the fire.

Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

Unsuitable Extinguishing Media

Do NOT use water or halogenated agents.

Fire Fighting Equipment/Instructions

Fire fighters should wear full-face, self-contained breathing apparatus and impervious protective clothing. Fire fighters should avoid inhaling any combustion products. Avoid creation of dusts.

NFPA Ratings: Health: 1 Fire: 1 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

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

Containment Procedures

Contain the discharged material. Remove sources of ignition.

Clean-Up Procedures

Shovel the material into waste container. Avoid the generation of dusts during clean-up.

Evacuation Procedures

Isolate area. Keep unnecessary personnel away.

Special Procedures

Wear appropriate personal protective equipment. See Section 8. Follow all Local, State, Federal and Provincial regulations for disposal.

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

Handling Procedures

Do not breathe fumes or dusts from this material. Use with adequate ventilation. Keep dusts and powders of this product from heat, sparks, or open flame. Use non-sparking tools when opening or closing containers. Do not touch or handle cast aluminum or heated materials before determining the temperature. Aluminum does not change color on heating. Series 2000 and 7000 alloy ingots must be stress relieved prior to being sawed to prevent an explosion or violent cracking. Products may have sharp edges. Handle with caution and wear appropriate personal protective equipment. Dry metal properly before loading in a melting furnace. Moisture trapped in crevices and occlusions can cause a violent explosion.

Storage Procedures

Keep the container tightly closed and in a cool, well-ventilated place. Store away from incompatible materials. If dusts and powders are formed, use adequate ventilation in storage and do not handle or store dusts or powders of this product near an open flame, heat or other sources of ignition.

Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

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

A: Component Exposure Limits

Consult local authorities for acceptable exposure limits.

Aluminum (7429-90-5)

ACGIH:	10 mg/m ³ TWA (metal dust) ²
OSHA:	15 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable fraction)
NIOSH:	10 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable fraction)
Alberta:	10 mg/m ³ TWA (dust)
British Columbia:	10 mg/m ³ TWA (total dust); 3 mg/m ³ TWA (respirable fraction)
Manitoba:	10 mg/m ³ TWA
New Brunswick:	10 mg/m ³ TWA (metal dust)
NW Territories:	10 mg/m ³ TWA 20 mg/m ³ STEL
Nova Scotia:	10 mg/m ³ TWA (metal dust)
Nunavut:	10 mg/m ³ TWA 20 mg/m ³ STEL
Ontario:	5 mg/m ³ TWAEV (powder); 10 mg/m ³ TWAEV (metal and oxide dust)
Quebec:	10 mg/m ³ TWAEV
Saskatchewan:	10 mg/m ³ TWA 20 mg/m ³ STEL

Silicon (7440-21-3)

OSHA:	10 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable fraction)
NIOSH:	10 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable fraction)
Alberta:	10 mg/m ³ TWA
British Columbia:	10 mg/m ³ TWA (total dust); 3 mg/m ³ TWA (respirable fraction)
Manitoba:	10 mg/m ³ TWA (total dust containing no asbestos and <1% free silica)
New Brunswick:	10 mg/m ³ TWA
NW Territories:	5 mg/m ³ TWA (respirable mass); 10 mg/m ³ TWA (total mass)
Nova Scotia:	10 mg/m ³ TWA
Nunavut:	5 mg/m ³ TWA (respirable mass); 10 mg/m ³ TWA (total mass)
Ontario:	10 mg/m ³ TWAEV (total dust)
Quebec:	10 mg/m ³ TWAEV (total dust, containing no asbestos and less than 1% crystalline silica)
Saskatchewan:	10 mg/m ³ TWA 20 mg/m ³ STEL
Yukon:	30 mppcf TWA; 10 mg/m ³ TWA 20 mg/m ³ STEL

² The ACGIH has proposed changing the TLV for aluminum from 10 mg/m³ as total dust to 1 mg/m³ as respirable particulate matter.

Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

Iron (7439-89-6)

- ACGIH: 5 mg/m³ TWA (respirable fraction) (related to Iron oxide (Fe₂O₃))
- OSHA: 10 mg/m³ TWA (fume) (related to Iron oxide)
- NIOSH: 5 mg/m³ TWA (dust and fume, as Fe) (related to Iron oxide)
- Alberta: 5 mg/m³ TWA (dust and fume, as Fe) (related to Iron oxide)
- British Columbia: 5 mg/m³ TWA (dust and fume, as Fe) (related to Iron oxide)
10 mg/m³ STEL (fume, as Fe) (related to Iron oxide)
- Manitoba: 5 mg/m³ TWA (as Fe, welding fumes, dust, total particulate) (related to Iron oxide (Fe₂O₃))
- New Brunswick: 5 mg/m³ TWA (particulate matter containing no asbestos and < 1% crystalline silica, dust and fume, as Fe) (related to Iron oxide (Fe₂O₃))
- NW Territories: 5 mg/m³ TWA (respirable mass); 10 mg/m³ TWA (total mass) (related to Rouge)
- Nova Scotia: 5 mg/m³ TWA (respirable fraction) (related to Iron oxide (Fe₂O₃))
- Nunavut: 5 mg/m³ TWA (respirable mass); 10 mg/m³ TWA (total mass) (related to Rouge)
- Ontario: 5 mg/m³ TWAEV (dust and fume, as Fe) (related to Iron oxide)
- Quebec: 5 mg/m³ TWAEV (dust and fume, as Fe) (related to Iron trioxide)
- Saskatchewan: 5 mg/m³ TWA (fume, as Fe) (related to Iron oxide)
10 mg/m³ STEL (fume, as Fe) (related to Iron oxide)
- Yukon: 5 mg/m³ TWA (fume as Fe₂O₃) (related to Iron oxide)
10 mg/m³ STEL (fume, as Fe₂O₃) (related to Iron oxide)

Zinc (7440-66-6)

- ACGIH: 2 mg/m³ TWA (respirable fraction) (related to Zinc oxide)
10 mg/m³ STEL (respirable fraction) (related to Zinc oxide)
- OSHA: 5 mg/m³ TWA (fume); 15 mg/m³ TWA (total dust); 5 mg/m³ TWA (respirable fraction) (related to Zinc oxide)
- NIOSH: 5 mg/m³ TWA (dust and fume) (related to Zinc oxide)
10 mg/m³ STEL (fume) (related to Zinc oxide)
15 mg/m³ Ceiling (dust) (related to Zinc oxide)
- Alberta: 10 mg/m³ TWA (dust); 5 mg/m³ TWA (fume) (related to Zinc oxide)
10 mg/m³ STEL (fume) (related to Zinc oxide)
- British Columbia: 2 mg/m³ TWA (respirable) (related to Zinc oxide)
10 mg/m³ STEL (respirable) (related to Zinc oxide)
- Manitoba: 5 mg/m³ TWA (fume); 10 mg/m³ TWA (total dust containing no asbestos and <1% crystalline silica) (related to Zinc oxide)
10 mg/m³ STEL (fume) (related to Zinc oxide)
- New Brunswick: 5 mg/m³ TWA (fume); 10 mg/m³ TWA (particulate matter containing no asbestos and < 1% crystalline silica, dust) (related to Zinc oxide)
10 mg/m³ STEL (fume) (related to Zinc oxide)
- NW Territories: 5 mg/m³ TWA (fume); 5 mg/m³ TWA (dust, respirable mass); 10 mg/m³ TWA (dust, total mass) (related to Zinc oxide)
10 mg/m³ STEL (fume) (related to Zinc oxide)
- Nova Scotia: 2 mg/m³ TWA (respirable fraction) (related to Zinc oxide)
10 mg/m³ STEL (respirable fraction) (related to Zinc oxide)
- Nunavut: 5 mg/m³ TWA (fume); 5 mg/m³ TWA (dust, respirable mass); 10 mg/m³ TWA (dust, total mass) (related to Zinc oxide)
10 mg/m³ STEL (fume) (related to Zinc oxide)
- Ontario: 2 mg/m³ TWAEV (respirable) (related to Zinc oxide)
10 mg/m³ STEV (respirable) (related to Zinc oxide)
- Quebec: 5 mg/m³ TWAEV (fume); 10 mg/m³ TWAEV (dust) (related to Zinc oxide)
10 mg/m³ STEV (fume) (related to Zinc oxide)
- Saskatchewan: 5 mg/m³ TWA (fume); 10 mg/m³ TWA (dust) (related to Zinc oxide)
10 mg/m³ STEL (fume); 20 mg/m³ STEL (dust) (related to Zinc oxide)
- Yukon: 5 mg/m³ TWA (fume); 30 mppcf TWA (dust); 10 mg/m³ TWA (dust) (related to Zinc oxide)
10 mg/m³ STEL (fume); 20 mg/m³ STEL (dust) (related to Zinc oxide)

Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

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 (fume, dusts, mists as Cu)
NIOSH: 1 mg/m³ TWA (dust and mist); 0.1 mg/m³ (respirable fume)
Alberta: 0.2 mg/m³ TWA (fume); 1 mg/m³ TWA (dust and mist, as Cu)
British Columbia: 1 mg/m³ TWA (dust and mist, as Cu); 0.2 mg/m³ TWA (fume, as Cu)
Manitoba: 0.2 mg/m³ TWA (fume); 1 mg/m³ TWA (dust and mist, as Cu)
New Brunswick: 0.2 mg/m³ TWA (fume); 1 mg/m³ TWA (dust and mist, as Cu)
NW Territories: 0.2 mg/m³ TWA (fume); 1 mg/m³ TWA (dust and mist)
0.6 mg/m³ STEL (fume); 2 mg/m³ STEL (dust and mist)
Nova Scotia: 0.2 mg/m³ TWA (fume); 1 mg/m³ TWA (dust and mist, as Cu)
Nunavut: 0.2 mg/m³ TWA (fume); 1 mg/m³ TWA (dust and mist, as Cu)
0.6 mg/m³ STEL (fume); 2 mg/m³ STEL (dust and mist, as Cu)
Ontario: 0.2 mg/m³ TWAEV (fume, as Cu); 1 mg/m³ TWAEV (dust and mist, as Cu)
Quebec: 0.2 mg/m³ TWAEV (fume, as Cu); 1 mg/m³ TWAEV (dust and mist, as Cu)
Saskatchewan: 0.2 mg/m³ TWA (fume, as Cu); 1 mg/m³ TWA (dust and mist, as Cu)
0.6 mg/m³ STEL (fume, as Cu); 2 mg/m³ STEL (dust and mist, as Cu)
Yukon: 0.2 mg/m³ TWA (fume); 1 mg/m³ TWA (dust and mist, as Cu)
0.2 mg/m³ STEL (fume); 2 mg/m³ STEL (dust and mist, as Cu)

Manganese (7439-96-5)

ACGIH: 0.2 mg/m³ TWA
OSHA: 5 mg/m³ Ceiling (Mn fume and Mn compounds)
NIOSH: 1 mg/m³ TWA (Mn fume and Mn compounds)
3 mg/m³ STEL (Mn fume and Mn compounds)
Alberta: 1 mg/m³ TWA (fume, as Mn)
British Columbia: 0.2 mg/m³ TWA
Manitoba: 1 mg/m³ TWA (fume)
3 mg/m³ STEL (fume)
5 mg/m³ Ceiling (dust)
New Brunswick: 0.2 mg/m³ TWA
NW Territories: 1 mg/m³ TWA (fume)
3 mg/m³ STEL (fume)
5 mg/m³ Ceiling
Nova Scotia: 0.2 mg/m³ TWA
Nunavut: 1 mg/m³ TWA (fume)
3 mg/m³ STEL (fume)
5 mg/m³ Ceiling
Ontario: 0.2 mg/m³ TWAEV
Quebec: 5 mg/m³ TWAEV (dust); 1 mg/m³ TWAEV (fume)
Saskatchewan: 5 mg/m³ TWA; 1 mg/m³ TWA (fume)
5 mg/m³ STEL; 3 mg/m³ STEL (fume)
Yukon: 5 mg/m³ Ceiling

Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

Magnesium (7439-95-4)

ACGIH:	10 mg/m ³ TWA (inhalable fraction) (related to Magnesium oxide)
OSHA:	10 mg/m ³ TWA (total particulate) (related to Magnesium oxide fume)
Alberta:	10 mg/m ³ TWA (fume) (related to Magnesium oxide)
British Columbia:	10 mg/m ³ TWA (fume, inhalable, as Mg); 3 mg/m ³ TWA (respirable dust and fume, as Mg) (related to Magnesium oxide)
	10 mg/m ³ STEL (respirable dust and fume, as Mg) (related to Magnesium oxide)
Manitoba:	10 mg/m ³ TWA (fume) (related to Magnesium oxide)
New Brunswick:	10 mg/m ³ TWA (fume) (related to Magnesium oxide)
NW Territories:	10 mg/m ³ TWA (fume, as Mg) (related to Magnesium oxide)
	20 mg/m ³ STEL (fume, as Mg) (related to Magnesium oxide)
Nova Scotia:	10 mg/m ³ TWA (inhalable fraction) (related to Magnesium oxide)
Nunavut:	10 mg/m ³ TWA (fume, as Mg) (related to Magnesium oxide)
	20 mg/m ³ STEL (fume, as Mg) (related to Magnesium oxide)
Ontario:	10 mg/m ³ TWAEV (inhalable) (related to Magnesium oxide)
Quebec:	10 mg/m ³ TWAEV (fume, as Mg) (related to Magnesium oxide)
Saskatchewan:	10 mg/m ³ TWA (fume) (related to Magnesium oxide)
	20 mg/m ³ STEL (fume) (related to Magnesium oxide)
Yukon:	10 mg/m ³ TWA (fume as Mg) (related to Magnesium oxide)
	10 mg/m ³ STEL (fume, as Mg) (related to Magnesium oxide)

Bismuth (7440-69-9)

Note: There are currently no applicable limits for the bismuth component of the products in the US.

Tin (7440-31-5)

ACGIH:	2 mg/m ³ TWA
OSHA:	2 mg/m ³ TWA
NIOSH:	2 mg/m ³ TWA
Alberta:	2 mg/m ³ TWA
British Columbia:	2 mg/m ³ TWA
Manitoba:	2 mg/m ³ TWA
New Brunswick:	2 mg/m ³ TWA
Nova Scotia:	2 mg/m ³ TWA
Ontario:	2 mg/m ³ TWAEV
Quebec:	2 mg/m ³ TWAEV
Saskatchewan:	2 mg/m ³ TWA
	4 mg/m ³ STEL

Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

Nickel (7440-02-0)

ACGIH:	1.5 mg/m3 TWA (inhalable fraction); 0.2 mg/m3 as insoluble compounds; 0.1 mg/m3 as soluble compounds (inhalable fraction)
OSHA:	1 mg/m3 TWA, 1.0 mg/m3 as Ni
NIOSH:	0.015 mg/m3 TWA
Alberta:	1.5 mg/m3 TWA
British Columbia:	0.05 mg/m3 TWA
Manitoba:	1 mg/m3 TWA
New Brunswick:	1 mg/m3 TWA
NW Territories:	1 mg/m3 TWA 2 mg/m3 STEL
Nova Scotia:	1.5 mg/m3 TWA (inhalable fraction)
Nunavut:	1 mg/m3 TWA 2 mg/m3 STEL
Ontario:	1 mg/m3 TWAEV (inhalable)
Quebec:	1 mg/m3 TWAEV
Saskatchewan:	0.50 mg/m3 TWA 1.50 mg/m3 STEL
Yukon:	1 mg/m3 TWA 3 mg/m3 STEL

Engineering Controls

Use local exhaust ventilation.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Wear safety glasses with side shields.

Personal Protective Equipment: Skin

Wear leather or other appropriate work gloves, if necessary for type of operation.

Personal Protective Equipment: Respiratory

If ventilation is not sufficient to effectively control exposures, appropriate NIOSH approved respirators should be used. Respirators should be selected and used under the direction of trained health and safety professionals in accordance with all applicable health, safety, and environmental regulations.

Personal Protective Equipment: General

Eye wash fountain is recommended.

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

Appearance:	Solid metallic pieces	Odor:	None
Physical State:	Solid	pH:	Not Available
Vapor Pressure:	Not Available	Vapor Density:	Not Available
Boiling Point:	Not Available	Melting Point:	950-1215°F (510-660°C)
Solubility (H2O):	<1 %	Specific Gravity:	2.5-2.9 g/cc

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

Chemical Stability

Stable under normal conditions.

Chemical Stability: Conditions to Avoid

Avoid ignition sources where dust is produced. Avoid incompatible materials.

Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

Special Sensitivity: Series 2000 and 7000 alloy ingots must be stress relieved prior to being sawed to prevent an explosion or violent cracking. When melting aluminum, aluminum alloys, or aluminum scrap, care must be taken to exclude water or moisture. Water or moisture trapped under hot or molten metal can result in a violent explosion. Strong oxidizing agents must be excluded during heating and melting operations to prevent the possibility of an explosion. Finely divided aluminum dusts may form explosive mixtures in air. Care should be taken to employ effective dust control measures.

Incompatibility

This product may react with strong acids, bases and oxidizing agents to product hydrogen gas, which is highly flammable. Contact with chlorinated solvents may release toxic and corrosive hydrogen chloride gas. Hot aluminum may react with chlorinated solvents to produce phosgene, a highly irritating and toxic gas.

Hazardous Decomposition

Decomposition of this product may yield metallic oxides.

Decomposition of coating oils present on some products will release carbon monoxide, carbon dioxide, and other hydrocarbon species.

Possibility of Hazardous Reactions

Will not occur.

* * * Section 11 - Toxicological Information * * *

Acute Dose Effects

A: General Product Information

Inhalation of metal fumes may cause metal fume fever, a flu-like illness generally lasting 24 hours or less.

Aluminum: Chronic overexposure to aluminum can result in lung damage and has been associated with asthma-like syndrome. Accumulation of aluminum in the body may result in neurological damage, anemia and bone softening. Repeated overexposure to high levels of aluminum oxide may lead to pulmonary fibrosis, a progressive lung disorder.

Silicon: Silicon dust seems to have little adverse effect on lungs and does not appear to produce significant organic disease or toxic effects when exposures are kept under reasonable control.

Iron: Chronic inhalation of iron has resulted in mottling of the lungs, a condition referred to as siderosis. This is considered benign pneumoconiosis and does not ordinarily cause significant physiologic impairment.

Zinc: Zinc poisoning can cause anemia, lethargy and dizziness. Inhalation of zinc fumes may cause metal fume fever, a flu-like illness generally lasting 24 hours or less.

Manganese: Overexposure to manganese may result in CNS effects, anemia and pneumonitis, which increased the risk of pneumonia.

Tin: Prolonged exposure to high concentration of tin-containing dusts and/or fumes may result in the development of Stannosis which is a rare benign pneumoconiosis. The maximum concentration of tin in the product is such that Stannosis should not present a potential hazard.

Nickel: Systemic effects from ingestion of nickel salts include capillary damage, kidney damage, myocardial weakness and central nervous system depression. Allergic skin sensitization reactions are the most frequent effect of exposure to nickel compounds. Contact with nickel compounds may also result in allergic lung sensitization reactions. Nickel is an identified human carcinogen.

B: Component Analysis - LD50/LC50

Silicon (7440-21-3)

Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

Oral LD50 Rat: 3160 mg/kg

Iron (7439-89-6)

Oral LD50 Rat: 984 mg/kg

Zinc (7440-66-6)

Oral LD50 Rat: >5000 mg/kg (related to Zinc oxide)

Manganese (7439-96-5)

Oral LD50 Rat: 9 g/kg

Magnesium (7439-95-4)

Oral LD50 Rat: 230 mg/kg

Bismuth (7440-69-9)

Oral LD50 Rat: 5 g/kg

Nickel (7440-02-0)

Oral LD50 Rat: >9000 mg/kg

Repeated Dose Effects

Exposure to metal dusts and oxides may cause fume fever. Fume fever is a temporary flu-like condition characterized by chills, fever, muscle aches and pains, nausea and vomiting. Typically the symptoms appear within a few hours after exposure and subside within 2-3 days with no permanent effects.

Asthma induced by occupational exposure to nickel has been documented. The asthma can result from either primary irritation or from an allergic response. Contact dermatitis in workers exposed to nickel compounds is one of the most prevalent effects of nickel exposure.

Carcinogenicity

A: General Product Information

No carcinogenicity data available for this product.

B: Component Carcinogenicity

Iron (7439-89-6)

ACGIH: A4 - Not Classifiable as a Human Carcinogen (dust and fume) (related to Iron oxide)

IARC: Supplement 7 [1987], Monograph 1 [1972] (related to Ferric oxide) (Group 3 (not classifiable))

Magnesium (7439-95-4)

ACGIH: A4 - Not Classifiable as a Human Carcinogen (related to Magnesium oxide)

Nickel (7440-02-0)

ACGIH: A5 - Not Suspected as a Human Carcinogen

NIOSH: occupational carcinogen

NTP: Reasonably Anticipated To Be A Carcinogen (Possible Select Carcinogen)

IARC: Monograph 49 [1990], Supplement 7 [1987] (Group 2B (possibly carcinogenic to humans))

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

No data available for this product. Coating oils may present an environmental hazard to aquatic and terrestrial flora and fauna.

Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Iron (7439-89-6)

Test & Species

96 Hr LC50 Morone saxatilis 13.6 mg/L

Conditions

static

Zinc (7440-66-6)

Test & Species

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

Conditions

Copper (7440-50-8)

Test & Species

96 Hr LC50 Pimephales promelas 23 µg/L

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

Conditions

Nickel (7440-02-0)

Test & Species

96 Hr LC50 Oncorhynchus mykiss 31.7 mg/L

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

Conditions

adult

Environmental Fate

No data available for this product.

*** Section 13 - Disposal Considerations ***

US EPA Waste Number & Descriptions

A: General Product Information

Material, if discarded, is not expected to be a characteristic hazardous waste under RCRA.

B: Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components.

Disposal Instructions

Dispose of waste material according to Local, State, Federal, and Provincial Environmental Regulations.

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

*** Section 14 - Transportation Information ***

US DOT Information

Shipping Name: Not regulated.

Additional Info.: Aluminum and aluminum alloys are not regulated for transportation. Aluminum powder is regulated: Aluminum Powder, Class 4.3, UN 1396, PG II.

TDG Information

Shipping Name: Not regulated.

Additional Info.: Aluminum and aluminum alloys are not regulated for transportation. Aluminum powder is regulated: Aluminum Powder, Class 4.3, UN 1396, PG II.

Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

* * * Section 15 - Regulatory Information * * *

US Federal Regulations

A: General Product Information

Components of this product have been checked against the non-confidential TSCA inventory by CAS Registry Number. Components not identified on this non-confidential inventory are either exempt from listing (i.e. polymers, hydrates) or are listed on the confidential inventory as declared by the supplier.

B: 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)

Zinc (7440-66-6)

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

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 equal to or exceeds 0.004 inches); 454 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the solid metal released is equal to or exceeds 0.004 inches)

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 equal to or exceeds 0.004 inches); 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 equal to or exceeds 0.004 inches)

Manganese (7439-96-5)

SARA 313: 1.0 % de minimis concentration

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 equal to or exceeds 0.004 inches); 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 equal to or exceeds 0.004 inches)

Chromium (7440-47-3)

The product contains less than 0.1 % chromium. Hot work operations such as welding, torch cutting, etc. will generate metal oxides, which can include hexavalent chromium. OSHA has enacted a standard for exposure to hexavalent chromium [29 CFR 1910.1026], which mandates very stringent exposure limits. Users of the product are urged to read this standard and determine how it might affect their operations.

C: 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

Acute Health: Yes **Chronic Health:** Yes **Fire:** No **Pressure:** No **Reactive:** No

Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

State Regulations

A: General Product Information

Other state regulations may apply. Check individual state requirements.

Aluminum and its alloys may contain up to 0.005% beryllium, 0.05% cadmium, <0.1% chromium, 0.05% lead, and 0.05% nickel as impurities if these elements are not listed in Section 3. Beryllium, cadmium, chromium, lead, and nickel have been identified as carcinogens or having developmental or reproductive toxicity by the State of California, as Special Health Hazard Substances by the States of New Jersey and Pennsylvania, and as Extraordinarily Hazardous Substances by the State of Massachusetts.

B: 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
Silicon	7440-21-3	No	Yes	Yes	Yes	Yes	Yes
Iron (¹ related to Iron oxide) (² related to Iron oxide fume)	7439-89-6	Yes	Yes ¹	Yes ²	Yes ¹	Yes ¹	Yes ¹
Zinc (¹ related to Zinc oxide)	7440-66-6	Yes	Yes	Yes ¹	Yes	Yes	Yes
Copper	7440-50-8	Yes	Yes	Yes	Yes	Yes	Yes
Manganese	7439-96-5	Yes	Yes	Yes	Yes	Yes	Yes
Magnesium (¹ related to Magnesium oxide fume)	7439-95-4	Yes	Yes	Yes ¹	Yes	Yes	Yes
Tin	7440-31-5	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.

Canadian WHMIS Information

A: General Product Information

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

B: Component Analysis - WHMIS IDL

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

Component	CAS #	Minimum Concentration
Aluminum	7429-90-5	1 %
Iron	7439-89-6	1 % (related to Ferric oxide)
Zinc	7440-66-6	1 % (related to Zinc oxide)
Copper	7440-50-8	1 %
Manganese	7439-96-5	1 %
Magnesium	7439-95-4	1 % (related to Magnesium oxide)
Nickel	7440-02-0	0.1 %

WHMIS Classification:

Class D2A: Very Toxic Material

Class D2B: Eye and skin irritation (If dusts are formed)

Additional Regulatory Information

A: General Product Information

No additional information available.

Material Safety Data Sheet

Material Name: Aluminum Alloys Containing Nickel

MSDS ID: KDS-3

B: Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Aluminum	7429-90-5	Yes	DSL	EINECS
Silicon	7440-21-3	Yes	DSL	EINECS
Iron	7439-89-6	Yes	DSL	EINECS
Zinc	7440-66-6	Yes	DSL	EINECS
Copper	7440-50-8	Yes	DSL	EINECS
Manganese	7439-96-5	Yes	DSL	EINECS
Magnesium	7439-95-4	Yes	DSL	EINECS
Bismuth	7440-69-9	Yes	DSL	EINECS
Tin	7440-31-5	Yes	DSL	EINECS
Coating Oil	64771-72-8	Yes	DSL	EINECS
Nickel	7440-02-0	Yes	DSL	EINECS

*** Section 16 - Other Information ***

Other Information

Coating Component Information:

111-82-0: Dodecanoic acid, methyl ester
112-39-0: Methyl palmitate
112-72-1: Myristic alcohol
124-10-7: Methyl tetradecanoate
30399-84-9: Isooctadecanoic acid
64771-72-8: Paraffins, petroleum, normal C5-20

Exercise caution when cutting the containment strapping that may secure some products, particularly wrought materials, during transportation. It may rebound and cause serious injury.

Reasonable care has been taken in the preparation of this information, but the manufacturer makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The manufacturer makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use.

Key/Legend

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. CHEMTREC = Chemical Transportation Emergency Center. DSL = Canadian Domestic Substance List. EINECS = European Inventory of New and Existing Chemical Substances. ELINCS = European List of Notified Chemical Substances. EPA = Environmental Protection Agency. HEPA = High Efficiency Particulate Air. HMIS = Hazardous Material Information System. IARC = International Agency for Research on Cancer. IDLH = Immediately Dangerous to Life and Health. MITI = Japanese Ministry of International Trade and Industry. NDSL = Canadian Non-Domestic Substance List. NFPA = National Fire Protection Association. NIOSH = National Institute of Occupational Safety and Health. NJTSR = New Jersey Trade Secret Registry. NTP = National Toxicology Program. OSHA = Occupational Safety and Health Administration. NA = Not available or Not Applicable. SARA = Superfund Amendments and Reauthorization Act. TDG = Transportation of Dangerous Goods. TLV = Threshold Limit Value. TSCA = Toxic Substances Control Act. WHMIS = Workplace Hazardous Materials Information System.

End of Sheet KDS-3