

Safety Data Sheet

Material Name: Non-Mercury Aluminum Anodes

SDS ID: KASP-2

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

Identification Number: KASP-2

Chemical Name: Aluminum

Product Use: Fabricated Parts

Synonyms: None

Manufacturer Information

Kaiser Aluminum

27422 Portola Parkway

Suite 200

Foothill Ranch, CA 92610

24 HR Emergency Telephone: CHEMTREC, call 1-800-424-9300;

International CHEMTREC, call: 001-703-527-3887

For non-emergency assistant Kaiser Aluminum, call: 1-877-335-9886

*** 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. 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. Eye contact with aluminum particles may cause corneal necrosis.

Potential Health Effects: Skin

Dust or powder may irritate the skin. Some products may contain residual coating. 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.

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

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

Hazard Label Pictograms:



Explosive



Irritant



Respiratory Sensitizer

Safety Data Sheet

Material Name: Non-Mercury Aluminum Anodes

SDS ID: KASP-2

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

CAS #	Component	Percent ¹
7429-90-5	Aluminum	90-100
Alloying Elements		
7440-21-3	Silicon	0.1-1, 1-5, 5-10, 10-15
7439-89-6	Iron	0.1-1, 1-5, 5-10
7440-66-6	Zinc	0.1-1, 1-5, 5-10
7440-50-8	Copper	0.1-1, 1-5, 5-10, 10-20
7439-95-4	Magnesium	0.1-1, 1-5, 5-10
7440-31-5	Tin	0.1-1, 1-5, 5-10
7440-69-9	Bismuth	0.1-1, 1-5, 5-10
7440-74-6	Indium	0.1-1, 1-5, 5-10
7440-55-3	Gallium	0.1-1, 1-5, 5-10

Component Related Regulatory Information

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

Component Information/Information on Non-Hazardous Components

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

***** 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. Give oxygen if breathing is difficult. 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.

Unusual Fire and Explosion Hazards

Fresh, very finely ground aluminum, may be pyrophoric when its particle size is 0.03 um or less. Dust is moderately flammable/explosive by heat, flame or chemical reaction with powerful oxidizers. May ignite on contact with vapors of AsCl₃, SCl₂, Se₂Cl₂, PCI₅; on contact with barium peroxide; contact with O₂; mixtures with picric acid + water after a delayed period; exothermic reaction with water + iron powder which emits hydrogen gas; and spontaneously ignites in CS₂ vapors.

May ignite and react violently with mixtures of sodium peroxide and O₂+H₂O; on contact with halogens and interhalogens. May react violently with hydrochloric acid, hydrofluoric acid, hydrogen chloride gas and disulfur dibromide; non-metals

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.

Safety Data Sheet

Material Name: Non-Mercury Aluminum Anodes

SDS ID: KASP-2

phosphorus, sulfur and selenium; with sulfur, Sb or As when heated; and potential violent reaction with sodium peroxide. May have a violent or explosive reaction when heated with metal oxides, oxosalts (nitrates, sulfates), some halocarbons, sulfides or hot copper oxide worked with an iron or steel tool. May have an explosive reaction with sodium sulfate above 800 oC; in powdered form with $KClO_4 + Ba(NO_3)_2 + KNO_3 + H_2O$ and $Ba(NO_3)_2 + KNO_3 + \text{sulfur} + \text{vegetable adhesives} + H_2O$ after a delayed period; powder forms sensitive explosive mixture with oxidants; mixtures with powdered AgCl, NH_4NO_3 , or $NH_4NO_3 + Ca(NO_3)_2 + \text{formamide} + H_2O$ are powerful explosives; mixtures with ammonium peroxodisulfate+water is explosive; and potential explosive reaction with CCl_4 during ball milling operations. Many violent or explosive reactions with the following halocarbons have occurred in industry: bromothane, bromotrifluoromethane, CCl_4 , chlorodifluoromethane, chloroform, chloromethane, chloromethane+2-methylpropane, dichlorodifluoromethane, 1, 2-dichloroethane, dichloromethane, 1, 2-dichloropropane, 1,2, -difluorotetrafluoroethane, fluorotrichloroethane, hexachloroethane alcohol, polytrifluoroethylene oils and greases, tetrachlorethylene, tetrachlorethylene, tetrafluoromethane, 1,1,1-trichloroethane, trichloroethylene, 1,1,2-trichlorotrifluoroethane, and trichlorotrifluoroethane-dichlorobenzene. (Sax, Dangerous Properties of Industrial Materials, eighth edition).

Hazardous Combustion Products

Decomposition of base metal product may yield metallic oxides.

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.

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. When dealing with aluminum powder/dust wear appropriate respiratory and protective equipment specified in Section 8. Isolate spill area, provide ventilation and extinguish sources of ignition. Vacuum up spill using a high efficiency particulate absolute (HEPA) air filter and place in a closed container for proper disposal. Use non-sparking tools.

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.

Safety Data Sheet

Material Name: Non-Mercury Aluminum Anodes

SDS ID: KASP-2

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

Handling Procedures

Do not breathe fumes or dust from this material. Use adequate ventilation. Keep dusts or 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. 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.

Good housekeeping and engineering practices should be employed to prevent the generation and accumulation of dusts. Vacuuming with a HEPA (High Efficiency Particulate Air) equipped vacuum is recommended to clean up any dusts that may be generated during handling and processing. Wash hands and face thoroughly before eating, drinking or smoking.

*** 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)
CAL-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 (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

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.

Safety Data Sheet**Material Name: Non-Mercury Aluminum Anodes****SDS ID: KASP-2****Silicon (7440-21-3)**

OSHA:	15 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable fraction)
CAL-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

Iron (7439-89-6)

ACGIH:	5 mg/m ³ TWA (respirable fraction) (related to Iron oxide (Fe ₂ O ₃))
OSHA:	10 mg/m ³ TWA (fume) (related to Iron oxide)
CAL-OSHA:	5 mg/m ³ TWA (fume) (related to Iron oxide)
NIOSH:	5 mg/m ³ TWA (dust and fume, as Fe) (related to Iron oxide)
Alberta:	5 mg/m ³ TWA (dust and fume, as Fe) (related to Iron oxide)
British Columbia:	5 mg/m ³ TWA (dust and fume, as Fe) (related to Iron oxide) 10 mg/m ³ STEL (fume, as Fe) (related to Iron oxide)
Manitoba:	5 mg/m ³ TWA (as Fe, welding fumes, dust, total particulate) (related to Iron oxide (Fe ₂ O ₃))
New Brunswick:	5 mg/m ³ TWA (particulate matter containing no asbestos and < 1% crystalline silica, dust and fume, as Fe) (related to Iron oxide (Fe ₂ O ₃))
NW Territories:	5 mg/m ³ TWA (respirable mass); 10 mg/m ³ TWA (total mass) (related to Rouge)
Nova Scotia:	5 mg/m ³ TWA (respirable fraction) (related to Iron oxide (Fe ₂ O ₃))
Nunavut:	5 mg/m ³ TWA (respirable mass); 10 mg/m ³ TWA (total mass) (related to Rouge)
Ontario:	5 mg/m ³ TWAEV (dust and fume, as Fe) (related to Iron oxide)
Quebec:	5 mg/m ³ TWAEV (dust and fume, as Fe) (related to Iron trioxide)
Saskatchewan:	5 mg/m ³ TWA (fume, as Fe) (related to Iron oxide) 10 mg/m ³ STEL (fume, as Fe) (related to Iron oxide)
Yukon:	5 mg/m ³ TWA (fume as Fe ₂ O ₃) (related to Iron oxide) 10 mg/m ³ STEL (fume, as Fe ₂ O ₃) (related to Iron oxide)

Safety Data Sheet**Material Name: Non-Mercury Aluminum Anodes****SDS ID: KASP-2****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)
- CAL-OSHA: 5 mg/m3 TWA, 10 mg/m3 STEL (related to Zinc oxide fume)
10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
- 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)

Safety Data Sheet

Material Name: Non-Mercury Aluminum Anodes

SDS ID: KASP-2

Copper (7440-50-8)

ACGIH:	0.2 mg/m ³ TWA (fume); 1 mg/m ³ TWA (dust and mist, as Cu)
OSHA/CAL-OSHA:	0.1 mg/m ³ TWA (fume), 1.0 mg/m ³ (dust and mist)
NIOSH:	1 mg/m ³ TWA (dust and mist); 0.1 mg/m ³ (respirable fume)
Alberta:	0.2 mg/m ³ TWA (fume); 1 mg/m ³ TWA (dust and mist, as Cu)
British Columbia:	1 mg/m ³ TWA (dust and mist, as Cu); 0.2 mg/m ³ TWA (fume, as Cu)
Manitoba:	0.2 mg/m ³ TWA (fume); 1 mg/m ³ TWA (dust and mist, as Cu)
New Brunswick:	0.2 mg/m ³ TWA (fume); 1 mg/m ³ TWA (dust and mist, as Cu)
NW Territories:	0.2 mg/m ³ TWA (fume); 1 mg/m ³ TWA (dust and mist) 0.6 mg/m ³ STEL (fume); 2 mg/m ³ STEL (dust and mist)
Nova Scotia:	0.2 mg/m ³ TWA (fume); 1 mg/m ³ TWA (dust and mist, as Cu)
Nunavut:	0.2 mg/m ³ TWA (fume); 1 mg/m ³ TWA (dust and mist, as Cu) 0.6 mg/m ³ STEL (fume); 2 mg/m ³ STEL (dust and mist, as Cu)
Ontario:	0.2 mg/m ³ TWAEV (fume, as Cu); 1 mg/m ³ TWAEV (dust and mist, as Cu)
Quebec:	0.2 mg/m ³ TWAEV (fume, as Cu); 1 mg/m ³ TWAEV (dust and mist, as Cu)
Saskatchewan:	0.2 mg/m ³ TWA (fume, as Cu); 1 mg/m ³ TWA (dust and mist, as Cu) 0.6 mg/m ³ STEL (fume, as Cu); 2 mg/m ³ STEL (dust and mist, as Cu)
Yukon:	0.2 mg/m ³ TWA (fume); 1 mg/m ³ TWA (dust and mist, as Cu) 0.2 mg/m ³ STEL (fume); 2 mg/m ³ STEL (dust and mist, as Cu)

Magnesium (1309-48-4)

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)
CAL-OSHA:	10 mg/m ³ TWA (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)

Safety Data Sheet

Material Name: Non-Mercury Aluminum Anodes

SDS ID: KASP-2

Tin (7440-31-5)

ACGIH:	2 mg/m3 TWA
OSHA:	2 mg/m3 TWA (inorganic compounds except oxides) 0.1 mg/m3 TWA (organic compounds)
CAL-OSHA:	0.1 mg/m3 TWA, 0.2 mg/m3 STEL (organic compounds)
Alberta:	2 mg/m3 TWA
British Columbia:	2 mg/m3 TWA
Manitoba:	2 mg/m3 TWA
New Brunswick:	2 mg/m3 TWA
Nova Scotia:	2 mg/m3 TWA
Ontario:	2 mg/m3 TWAEV
Quebec:	2 mg/m3 TWAEV
Saskatchewan:	2 mg/m3 TWA 4 mg/m3 STEL

Indium (7440-74-6)

ACGIH:	0.1 mg/m3 TWA
NIOSH:	0.1 mg/m3 TWA
Alberta:	0.1 mg/m3 TWA
British Columbia:	0.1 mg/m3 TWA
Manitoba:	0.1 mg/m3 TWA
New Brunswick:	0.1 mg/m3 TWA
NW Territories:	0.1 mg/m3 TWA 0.3 mg/m3 STEL
Nova Scotia:	0.1 mg/m3 TWA
Nunavut:	0.1 mg/m3 TWA 0.3 mg/m3 STEL
Ontario:	0.1 mg/m3 TWAEV
Quebec:	0.1 mg/m3 TWAEV
Saskatchewan:	0.1 mg/m3 TWA 0.3 mg/m3 STEL
Yukon:	0.1 mg/m3 TWA 0.3 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

Wear appropriate protective clothing.

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

Safety Data Sheet

Material Name: Non-Mercury Aluminum Anodes

SDS ID: KASP-2

Appearance: Solid metallic pieces
Physical State: Solid
Vapor Pressure: Not Available
Boiling Point: Not Available
Solubility (H2O): Insoluble

Odor: None
pH: Not Available
Vapor Density: Not Available
Melting Point: 1215°F (660°C)
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. May react with chlorinated solvents to produce toxic hydrogen chloride. Hot aluminum may react with chlorinated solvents to produce phosgene, a highly irritating and toxic gas.

Special Sensitivity: 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 produce 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, such as aluminum oxide. Hydrogen may also be produced when reacted with some acids and caustic solutions.

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.

Copper: Acute poisoning from ingestion of excessive copper can cause temporary gastrointestinal distress with symptoms such as nausea, vomiting, and abdominal pain. High levels of exposure to copper can cause destruction of red blood cells, possibly resulting in anemia.

Safety Data Sheet

Material Name: Non-Mercury Aluminum Anodes

SDS ID: KASP-2

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.

B: Component Analysis - LD50/LC50

Silicon (7440-21-3)

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)

Magnesium (7439-95-4)

Oral LD50 Rat: 230 mg/kg

Bismuth (7440-69-9)

Oral LD50 Rat: 5 g/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.

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)

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

No data available for this product. Product is not expected to present an environmental hazard to aquatic and terrestrial flora and fauna.

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

Conditions



Safety Data Sheet

Material Name: Non-Mercury Aluminum Anodes

SDS ID: KASP-2

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
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

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.

*** 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)

Safety Data Sheet

Material Name: Non-Mercury Aluminum Anodes

SDS ID: KASP-2

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)

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: No Fire: No Pressure: No Reactive: No

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, and 0.05% lead 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
Copper	7440-50-8	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
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
Gallium	7440-55-3	No	No	Yes	Yes	No	No
Indium	7440-74-6	Yes	Yes	Yes	Yes	Yes	Yes



Safety Data Sheet

Material Name: Non-Mercury Aluminum Anodes

SDS ID: KASP-2

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 SDS 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 %
Magnesium	7439-95-4	1 % (related to Magnesium oxide)
Tin	7440-31-5	1 %
Gallium	7440-55-3	1 %
Indium	7440-74-6	1 %

C: WHMIS Classification

D2B- Irritating to eyes and skin when dusts formed.

Additional Regulatory Information

A: General Product Information

No additional information available.

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
Magnesium	7439-95-4	Yes	DSL	EINECS
Tin	7440-31-5	Yes	DSL	EINECS
Bismuth	7440-69-9	Yes	DSL	EINECS
Gallium	7440-55-3	Yes	DSL	EINECS
Indium	7440-74-6	Yes	DSL	EINECS

*** Section 16 - Other Information ***

Other Information

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.



Safety Data Sheet

Material Name: Non-Mercury Aluminum Anodes

SDS ID: KASP-2

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 KASP-2