

KAISER ALUMINUM

& CHEMICAL CORPORATION

5847 San Felipe, Suite 2600, Houston, TX 77057

MATERIAL SAFETY DATA SHEET ALUMINUM ALLOYS CONTAINING CHROMIUM

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

COMPANY NAME:
Kaiser Aluminum & Chemical Corporation
5847 San Felipe, Suite 2600
Houston, TX 77057

EMERGENCY TELEPHONE NO.:
(510) 847-5845
CHEMTREC (800) 424-9300

TRADE NAME:
Aluminum Alloys Containing Chromium

IDENTIFICATION NUMBER:
KDS-4

CHEMICAL NAME:
Aluminum (Minimum 0.1% Chromium)

SYNONYMS:
None

2. INGREDIENTS

Component	Type	CAS #	Percent	ACGIH TLV	OSHA PEL	Units
BASE METAL						
Aluminum mg/M ³		7429-90-5	>80.0	10 (D) 5 (F)	15 (T) 5 (R&F)	mg/M ³
ALLOYING ELEMENT						
Chromium mg/M ³	P,W	7440-47-3	<1.0	0.5 (Me,III)	1 (Me)	mg/M ³
Copper mg/M ³	P	7440-50-8	<1.0	1 (I,D,M)	0.5 (II,III) 1 (D,M)	mg/M ³
Iron Not Est.	W P	7439-89-6	<10.0 <10.0	0.2 (F,R) Not Est.	0.1 (F) Not Est.	mg/M ³
Magnesium Not Est.	W P	7439-95-4	<1.0 <1.0	Not Est.	Not Est.	
Manganese mg/M ³	W W	7439-96-5	<10.0 <10.0	0.2	5 (C,T)	
Silicon mg/M ³	P,W	7440-21-3	<1.0	10 (T)	1 (F,T) 3 (F,STEL) 10 (T)	mg/M ³ mg/M ³
Tin mg/M ³	P	7440-31-5	<1.0	2 (As Sn)	5 (R)	mg/M ³ 2 (As Sn)
Zinc Not Est.	P W	7440-66-6	<1.0 <10.0	Not Est.	Not Est.	

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, 112-39-0, 112-72-1, 124-10-7, 30399-84-9, 36653-82-4, 64771-72-8, and proprietary corrosion inhibitors. With

the exception of 64771-72-8 there are no established or recommended exposure limits. The manufacturer recommends a 5 mg/M³ time weighted average exposure limit for 64771-72-8.

2. INGREDIENTS - Continued

ACGIH TLVs are based on 2001 values. OSHA PELs are based on the more stringent 1987 values, which were subsequently vacated by the courts. All values are 8-hour time-weighted averages unless otherwise noted. (P) represents prime and ingot hardener aluminum. (W) represents wrought aluminum (fabricated products). (T) represents total particulate matter. (R) represents the respirable fraction of particulate matter. (D) represents dust. (F) represents fume. (I) represents inhalable fraction of particulate matter. (M) represents mists. (C) represents a ceiling exposure limit that should not be exceeded at any time. (STEL) represents Short Term Exposure Limit - normally 15 minutes. Me represents metal. (II) represents chromium in the +2 oxidation state. (III) represents chromium in the +3 oxidation state.

Note: Exposures to iron, magnesium, and zinc-based materials would most probably arise from the oxides, 1309-37-1, 1309-48-4, and 1314-13-2 respectively, during high temperature operations. The ACGIH and OSHA have recommend or mandated exposure limits between 5 mg/M³ and 15 mg/M³ on a TWA basis for the total and respirable forms of these materials and their fumes.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Product is metallic shapes with no odor. As shipped, the product is considered non-hazardous. Dust and particulate matter may cause irritation of eyes, skin, mucous membranes, and respiratory tract. Wear appropriate personal protective equipment. Keep individuals not involved in the clean-up out of the area. Pick up released product with appropriate implements and return to original container if reusable. If not reusable, place in appropriate containers for disposal. Although the product itself is non-hazardous, material collected during clean-up operations may be contaminated and should be treated as hazardous unless specific testing, including TCLP, shows the collected material to be non-hazardous. Product is not expected to present an environmental hazard.

POTENTIAL HEALTH EFFECTS:

In its manufactured and shipped state the product is considered non-hazardous. Processing, including melting, casting, machining, forging, cutting, grinding, or welding, may result in the generation of dusts, fumes, or particulate matter which have potential health effects discussed below.

Eye:	Vapors, dusts, fumes, and particulate matter may cause irritation of the eyes.
Skin Contact:	Vapors, dusts, fumes, and particulate matter may cause mechanical irritation of the skin.
Skin Absorption:	Not known to be absorbed through the intact skin.
Ingestion:	Not expected to be an important route of entry into the body. Ingestion of large quantities of product dusts or particulate matter may cause gastric discomfort or distress.
Inhalation:	Vapors, dusts, fumes, and particulate matter may cause irritation of the mucous membranes and respiratory tract. Inhalation of high concentrations of freshly formed metal oxide fumes may cause "Metal Fume Fever". It is characterized by fever, chills, sore muscles and joints, and a metallic taste in the mouth. The condition is self-limiting and generally resolves in 24 to 48 hours.

3. HAZARDS IDENTIFICATION - Continued

Chronic and Carcinogenicity: Prolonged exposure to dusts and particulate matter may cause dermatitis. Prolonged exposures may cause neurological and lung disorders. Pre-existing skin, lung, and neurological conditions may be aggravated by exposure to the components of the product. See Sections 11 and 16.

4. FIRST AID MEASURES

Inhalation: Remove exposed person to fresh air. If breathing is difficult, oxygen may be administered. If breathing has stopped, artificial respiration should be started immediately. Seek medical attention.

Eyes: Flush with tepid water for at least 20 minutes holding the eyelids wide open. Seek medical attention if irritation develops.

Skin: Wash thoroughly with mild soap and water. Seek medical attention if irritation develops. Remove any contaminated clothing and launder thoroughly before reuse.

Ingestion: Not expected to be an important route of entry into the body. If large amounts of the product are ingested, seek medical attention and advise physician of possible fluoride exposure.

5. FIRE FIGHTING MEASURES

Flash Point: NA **LEL:** NA **UEL:** NA **Auto Ign. Temp.:** NA

Coating oils can be ignited by open flames and other sources of ignition while the aluminum base product will ignite only under extreme conditions. Use a water spray or fog, dry chemical, or foam for oil fires. Use dry powder, talc, or sand to extinguish metal fires. Do not use water or halogenated agents. 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. A self-contained breathing apparatus operating in the positive pressure mode and full fire fighting gear should be worn for combating fires.

6. ACCIDENTAL RELEASE MEASURES

Pick up released product with appropriate implements and place in appropriate containers for reuse, recycling, or disposal. Appropriate personal protective equipment cited in Section 8 should be worn during all clean-up operations. Although the product itself is non-hazardous, material collected during clean-up operations may be contaminated and should be treated as hazardous unless specific testing, including TCLP, shows the collected material to be non-hazardous.

7. HANDLING AND STORAGE

Do not store with or near incompatible materials cited in Section 10. Store out of contact with the elements. Appropriate personal protective equipment cited in Section 8 should be worn during handling. Good housekeeping and engineering practices should be employed to prevent the generation and accumulation of dusts. Wet mopping or vacuuming 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.

8. EXPOSURE CONTROL - PERSONAL PROTECTION

Engineering Controls: Local exhaust ventilation should be provided to maintain exposures below the limits cited in Section 2. Design details for local exhaust ventilation systems may be found in the latest edition of "Industrial Ventilation: A Manual of Recommended Practice", published by the ACGIH Committee on Industrial Ventilation, P.O. Box 16153, Lansing, MI, 48910. The need for local exhaust ventilation should be evaluated by a professional industrial hygienist. Local exhaust ventilation systems should be designed by a professional engineer.

Respiratory Protection: If exposures exceed limits cited in Section 2, use, as a minimum, a NIOSH approved 1/2 face-piece respirator with cartridges approved for organic vapors and particulate matter. If exposures exceed 10 times the limits cited in Section 2, consult your respiratory protection equipment supplier or a professional industrial hygienist for selection of the proper equipment. The evaluation of the need for respiratory protection should be made by a professional industrial hygienist.

Eye Protection: Chemical protective goggles are recommended where there is the possibility of eye contact with the product dusts or particulates. Safety glasses with side-shields are recommended for all other operations.

Protective Gloves: Polymeric gloves are recommended to prevent possible irritation and sensitization. PVC or similar materials are recommended. Heavy leather or similar gloves are recommended where sharp edges may be encountered.

General: A polymeric coated apron or other body covering is recommended where regular work clothing may become contaminated with the product. All soiled or dirty clothing and personal protective equipment should be thoroughly cleaned before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND PHYSICAL STATE: Metallic Shapes	OCTANOL/WATER PARTITION COEFFICIENT: NA
VAPOR DENSITY (AIR =1): NA	MELT POINT: 950-1215° F (510-660° C)
VAPOR PRESSURE: NA	EVAPORATION RATE (BUTYL ACETATE = 1): NA
ODOR: None	SPECIFIC GRAVITY/BULK DENSITY: 2.5-2.9 g/cc
% VOLATILE BY VOLUME: Not Volatile	BOILING POINT: NA
% SOLUBILITY (H ₂ O): <1	pH: NA

10. STABILITY AND REACTIVITY

Stability & Polymerization: Product is stable. Hazardous polymerization will not occur.

Incompatibility (Conditions to Avoid): Do not store near open flames or other sources of ignition. Do not store with or near strong acids, bases, or oxidizing agents. Reaction of aluminum with strong acids or bases may generate hydrogen gas, which can form explosive mixtures in air. Do not allow to come into contact with chlorinated solvents. Aluminum will react with these solvents to produce hydrogen chloride or hydrochloric acid

which is highly corrosive and irritating. Hot aluminum will react with chlorinated solvents to produce phosgene gas which is highly irritating and toxic.

10. STABILITY AND REACTIVITY - Continued

Hazardous Decomposition Products: Coating oils will liberate oxides of carbon and low molecular weight hydrocarbons whose composition and toxicity has not been determined. Aluminum base product is stable to at least 950° F. At temperatures well above the melting point, metal oxide fumes may be liberated. Welding, cutting, or brazing aluminum and/or aluminum alloys may generate oxides of carbon and nitrogen, ozone, and infrared and ultraviolet radiation in addition to metal oxide fumes. Appropriate personal protective equipment should be utilized during welding, cutting, and brazing operations.

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. See also Section 16.

11. TOXICOLOGICAL INFORMATION

Aluminum metal and alloys have a low order of both acute and chronic toxicity.

Prolonged exposure to high concentration of manganese-containing dusts and/or fumes may result in the development of a neurological disorder – Manganism. It is not expected that Manganism will develop if exposures are maintained below the limits cited in Section 2. Symptoms of manganism develop very gradually over a period of years and can include headache, irritability, insomnia, and muscle cramps. In severe cases severe muscle rigidity, and impairment of gait may develop. The symptoms are not always reversible upon cessation of exposure.

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.

12. ECOLOGICAL INFORMATION

Detailed studies on the environmental fate of the product have not been conducted. The coating oils may present an environmental hazard to aquatic and terrestrial flora and fauna.

13. DISPOSAL CONSIDERATIONS

As supplied, product is considered non-hazardous. Recycling is the preferred method of disposal. Alternatively it should be disposed of in an EPA approved landfill in accordance with all local, state, and federal regulations. If used or waste product is disposed of, testing, including TCLP, should be conducted to determine hazard characteristics.

14. TRANSPORTATION INFORMATION

Aluminum and aluminum alloys are not normally regulated under Department of Transportation regulations. Aluminum Powder is regulated: Aluminum Powder, 4.3, UN1396, PG II

Air Restrictions:

Passenger Aircraft = 15 kg; Cargo Only Aircraft = 50 kg.

15. REGULATORY INFORMATION

The aluminum (as dust or fume), chromium, copper, manganese, and zinc components of the product are reportable under Section 313 of the Superfund Amendments and Reauthorization Act of 1986. Consult specifications for the percentage in a particular product.

OSHA Hazard Communication Categories for Dusts, Fumes and Particulates: Irritant, Lung Hazard, Skin Hazard, Neurological Hazard.

SARA Hazard Categories for Dusts, Fumes, and Particulates: Acute Hazard, Chronic Hazard

Aluminum and its alloys may contain up to 0.05% beryllium, 0.05% cadmium, 1.0% chromium, 0.05% lead, and 0.05% nickel. These materials have been identified as carcinogens or teratogens 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.

All components of the product are included in the Toxic Substances Control Act (TSCA) inventory.

16. OTHER INFORMATION

Not Est. = Not Established; NA = Not Applicable; ND = Not Determined

Some aluminum may be contaminated with oils. These will be vaporized during operations that require heating. The vapors may be irritating to the eyes, mucous membranes, and respiratory tract. Prolonged dermal contact may cause skin irritation. 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 burns.

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

Prepared By: Corporate Environmental Affairs, Health and Safety

Preparation /Revision Date: 6/10/02 - Supersedes Revision Dated 2/1/02

Reason for Revision: Revised Chemical Name

IMPORTANT SAFETY NOTICE

The information contained in the Material Safety Data Sheet relates only to the specific material(s) described herein and does not relate to use in combination with any other material or substance or in any process. We believe that the information contained herein is current as of the date of issue of this Material Safety Data Sheet. *Because the use of this information and these opinions and the conditions of use of this product are not within the control of Kaiser Aluminum & Chemical Corporation, it is the user's obligation to determine the conditions of safe use of the product.*

Users of this product should study this Material Safety Data Sheet and become aware of the product hazards and safety information before using the product. Users should also notify their employees, agents, and contractors regarding information contained in this Material Safety Data Sheet and any product hazards and safety information in order to provide safe use of this product.

MATERIAL SAFETY DATA SHEET
ALUMINUM ALLOYS CONTAINING LEAD

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

COMPANY NAME: Kaiser Aluminum & Chemical Corporation 5847 San Felipe, Suite 2600 Houston, TX 77057	EMERGENCY TELEPHONE NO.: (713) 267-3714 CHEMTREC (800) 424-9300
TRADE NAME: Aluminum Alloys Containing Lead	IDENTIFICATION NUMBER: KDS-7
CHEMICAL NAME: Aluminum (Minimum 0.1% Lead)	SYNONYMS: None

2. INGREDIENTS

<u>Component</u>	<u>Type</u>	<u>CAS #</u>	<u>Percent</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>Units</u>
BASE METAL						
Aluminum		7429-90-5	>80.0	10 (D) 5 (F)	15 (T) 5 (R&F)	mg/M ³ mg/M ³
ALLOYING ELEMENT						
Bismuth	P,W	7440-69-9	<1.0	Not Est.	Not Est.	Not Est.
Copper	P	7440-50-8	<1.0	1 (I,D,M)	1 (D,M)	mg/M ³
	W		<10.0	0.2 (F,R)	0.1 (F)	mg/M ³
Iron	P,W	7439-89-6	<10.0	Not Est.	Not Est.	Not Est.
Lead	P,W	7439-92-1	<1.0	0.05	0.05	mg/M ³
Magnesium	P	7439-95-4	<1.0	Not Est.	Not Est.	Not Est.
	W		<10.0			
Manganese	W	7439-96-5	<10.0	0.2	5 (C,T) 1 (F,T)	mg/M ³ mg/M ³
					3 (F,STEL)	mg/M ³
Silicon	P,W	7440-21-3	<10.0	10 (T)	10 (T) 5 (R)	mg/M ³ mg/M ³
Tin	P	7440-31-5	<10.0	2 (As Sn)	2 (As Sn)	mg/M ³
Zinc	P,W	7440-66-6	<10.0	Not Est.	Not Est.	Not Est.

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, 112-39-0, 112-72-1, 124-10-7, 30399-84-9, 36653-82-4, 64771-72-8, and proprietary corrosion inhibitors. With the exception of 64771-72-8 there are no established or recommended exposure limits. The manufacturer recommends a 5 mg/M³ time weighted average exposure limit for 64771-72-8.

14. TRANSPORTATION INFORMATION

Aluminum and aluminum alloys are not normally regulated under Department of Transportation regulations. Aluminum Powder is regulated: Aluminum Powder, 4.3, UN 1396, PG II
Air Restrictions: Passenger Aircraft = 15 kg; Cargo Only Aircraft = 50 kg.

15. REGULATORY INFORMATION

The aluminum (as dust or fume), copper, lead, manganese, and zinc components of the product are reportable under Section 313 of the Superfund Amendments and Reauthorization Act of 1986. Consult specifications for the percentage in a particular product.

OSHA Hazard Communication Categories for Dusts, Fumes, and Particulates: Irritant, Lung Hazard, Skin Hazard, Neurological Hazard, Reproductive Hazard.

SARA Hazard Categories for Dusts, Fumes, and Particulates: Acute Hazard, Chronic Hazard

Aluminum and its alloys may contain up to 0.05% beryllium, 0.05% cadmium, <0.1% chromium, 0.70% lead, and 0.05% nickel. These materials have been identified as carcinogens or teratogens 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.

All components of the product are included in the Toxic Substances Control Act (TSCA) inventory.

16. OTHER INFORMATION

Not Est. = Not Established; NA = Not Applicable; ND = Not Determined

Some aluminum may be contaminated with oils. These will be vaporized during operations that require heating. The vapors may be irritating to the eyes, mucous membranes, and respiratory tract. Prolonged dermal contact may cause skin irritation. 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 burns.

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

Prepared By: Corporate Environmental Affairs, Health, and Safety

Preparation /Revision Date: 2/1/02 - Supersedes Revision Dated 3/1/98

Reason for Revision: Review and update all information and change corporate address

IMPORTANT SAFETY NOTICE

The information contained in the Material Safety Data Sheet relates only to the specific material(s) described herein and does not relate to use in combination with any other material or substance or in any process. We believe that the information contained herein is current as of the date of issue of this Material Safety Data Sheet. *Because the use of this information and these opinions and the conditions of use of this product are not within the control of Kaiser Aluminum & Chemical Corporation, it is the user's obligation to determine the conditions of safe use of the product.*

Users of this product should study this Material Safety Data Sheet and become aware of the product hazards and safety information before using the product. Users should also notify their employees, agents, and contractors regarding information contained in this Material Safety Data Sheet and any product hazards and safety information in order to provide safe use of this product.

10. STABILITY AND REACTIVITY - Continued

Hazardous Decomposition Products: Coating oils will liberate oxides of carbon and low molecular weight hydrocarbons whose composition and toxicity has not been determined. Aluminum base product is stable to at least 950° F. At temperatures well above the melting point, metal oxide fumes may be liberated. Welding, cutting, or brazing aluminum and/or aluminum alloys may generate oxides of carbon and nitrogen, ozone, and infrared and ultraviolet radiation in addition to metal oxide fumes. Appropriate personal protective equipment should be utilized during welding, cutting, and brazing operations.

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. See also Section 16.

11. TOXICOLOGICAL INFORMATION

Aluminum metal and alloys have a low order of both acute and chronic toxicity.

Lead compounds can have a variety of effects. Lead poisoning is characterized by muscle weakness, weight loss, listlessness, insomnia, gastrointestinal disturbances, and low blood pressure. In severe cases, neuromuscular damage can occur as well as permanent brain damage. In addition to generalized poisoning, lead can have potentially serious reproductive effects for both males and females. Lead exposure can cause decreased fertility in both males and females. Male sperm counts can be decreased and sperm morphology altered while the female ovulatory cycle can be disrupted. Lead can also cross the placental barrier and affect the developing fetus. Studies have shown that in-utero lead exposure can lead to potentially severe developmental disabilities. It is not expected that any adverse effects from lead will develop if exposures are maintained below the limits cited in Section 2.

Prolonged exposure to high concentration of manganese-containing dusts and/or fumes may result in the development of a neurological disorder – Manganism. It is not expected that Manganism will develop if exposures are maintained below the limits cited in Section 2. Symptoms of manganism develop very gradually over a period of years and can include headache, irritability, insomnia, and muscle cramps. In severe cases severe muscle rigidity, and impairment of gait may develop. The symptoms are not always reversible upon cessation of exposure.

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.

12. ECOLOGICAL INFORMATION

Detailed studies on the environmental fate of the product have not been conducted. The coating oils may present an environmental hazard to aquatic and terrestrial flora and fauna.

13. DISPOSAL CONSIDERATIONS

As supplied, product is considered non-hazardous. Recycling is the preferred method of disposal. Alternatively it should be disposed of in an EPA approved landfill in accordance with all local, state, and federal regulations. If used or waste product is disposed of, testing, including TCLP, should be conducted to determine hazard characteristics.

8. EXPOSURE CONTROL - PERSONAL PROTECTION

Engineering Controls: Local exhaust ventilation should be provided to maintain exposures below the limits cited in Section 2. Design details for local exhaust ventilation systems may be found in the latest edition of "Industrial Ventilation: A Manual of Recommended Practice", published by the ACGIH Committee on Industrial Ventilation, P.O. Box 16153, Lansing, MI, 48910. The need for local exhaust ventilation should be evaluated by a professional industrial hygienist. Local exhaust ventilation systems should be designed by a professional engineer.

Respiratory Protection: If exposures exceed limits cited in Section 2, use, as a minimum, a NIOSH approved 1/2 face-piece respirator with cartridges approved for organic vapors and particulate matter. If exposures exceed 10 times the limits cited in Section 2, consult your respiratory protection equipment supplier or a professional industrial hygienist for selection of the proper equipment. The evaluation of the need for respiratory protection should be made by a professional industrial hygienist.

Eye Protection: Chemical protective goggles are recommended where there is the possibility of eye contact with the product dusts and particulates. Safety glasses with side-shields are recommended for all other operations.

Protective Gloves: Polymeric gloves are recommended to prevent possible irritation and sensitization. PVC or similar materials are recommended. Heavy leather or similar gloves are recommended where sharp edges may be encountered.

General: A polymeric coated apron or other body covering is recommended where regular work clothing may become contaminated with the product. All soiled or dirty clothing and personal protective equipment should be thoroughly cleaned before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND PHYSICAL STATE: Metallic Shapes	OCTANOL/WATER PARTITION COEFFICIENT: NA
VAPOR DENSITY (AIR =1): NA	MELT POINT: 950-1215° F (510-660° C)
VAPOR PRESSURE: NA	EVAPORATION RATE (BUTYL ACETATE = 1): NA
ODOR: None	SPECIFIC GRAVITY/BULK DENSITY: 2.5-2.9 g/cc
% VOLATILE BY VOLUME: Not Volatile	BOILING POINT: NA
% SOLUBILITY (H ₂ O): <1	pH: NA

10. STABILITY AND REACTIVITY

Stability & Polymerization: Product is stable. Hazardous polymerization will not occur.

Incompatibility (Conditions to Avoid): Do not store near open flames or other sources of ignition. Do not store with or near strong acids, bases, or oxidizing agents. Reaction of aluminum with strong acids or bases may generate hydrogen gas which can form explosive mixtures in air. Do not allow to come into contact with chlorinated solvents. Aluminum will react with these solvents to produce hydrogen chloride or hydrochloric acid which is highly corrosive and irritating. Hot aluminum will react with chlorinated solvents to produce phosgene gas which is highly irritating and toxic.

3. HAZARDS IDENTIFICATION - Continued

Chronic and Carcinogenicity: Prolonged exposure to dusts and particulate matter may cause dermatitis. Exposure to high concentrations of lead may cause lead poisoning. Prolonged exposures may cause neurological and lung disorders. Pre-existing skin, lung, and neurological conditions may be aggravated by exposure to the components of the product. See Sections 11 and 16.

4. FIRST AID MEASURES

Inhalation: Remove exposed person to fresh air. If breathing is difficult, oxygen may be administered. If breathing has stopped, artificial respiration should be started immediately. Seek medical attention.

Eyes: Flush with tepid water for at least 20 minutes holding the eyelids wide open. Seek medical attention if irritation develops.

Skin: Wash thoroughly with mild soap and water. Seek medical attention if irritation develops. Remove any contaminated clothing and launder thoroughly before reuse.

Ingestion: Not expected to be an important route of entry into the body. If large amounts of the product are ingested, seek medical attention.

5. FIRE FIGHTING MEASURES

Flash Point: NA **LEL:** NA **UEL:** NA **Auto Ign. Temp.:** NA

Coating oils can be ignited by open flames and other sources of ignition while the aluminum base product will ignite only under extreme conditions. Use a water spray or fog, dry chemical, or foam for oil fires. Use dry powder, talc, or sand to extinguish metal fires. Do not use water or halogenated agents. 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. A self-contained breathing apparatus operating in the positive pressure mode and full fire fighting gear should be worn for combating fires.

6. ACCIDENTAL RELEASE MEASURES

Pick up released product with appropriate implements and place in appropriate containers for reuse, recycling, or disposal. Appropriate personal protective equipment cited in Section 8 should be worn during all clean-up operations. Although the product itself is non-hazardous, material collected during clean-up operations may be contaminated and should be treated as hazardous unless specific testing, including TCLP, shows the collected material to be non-hazardous.

7. HANDLING AND STORAGE

Do not store with or near incompatible materials cited in Section 10. Store out of contact with the elements. Appropriate personal protective equipment cited in Section 8 should be worn during handling. Good housekeeping and engineering practices should be employed to prevent the generation and accumulation of dusts. Wet mopping or vacuuming 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.

2. INGREDIENTS - Continued

ACGIH TLVs are based on 2001 values. OSHA PELs are based on the more stringent 1987 values, which were subsequently vacated by the courts. All values are 8-hour time-weighted averages unless otherwise noted. (P) represents prime and ingot hardener aluminum. (W) represents wrought aluminum (fabricated products). (T) represents total particulate matter. (R) represents the respirable fraction of particulate matter. (D) represents dust. (F) represents fume. (I) represents inhalable fraction of particulate matter. (M) represents mists. (C) represents a ceiling exposure limit that should not be exceeded at any time. (STEL) represents Short Term Exposure Limit - normally 15 minutes.

Note: Exposures to iron, magnesium, and zinc-based materials would most probably arise from the oxides, 1309-37-1, 1309-48-4, and 1314-13-2 respectively, during high temperature operations. The ACGIH and OSHA have recommend or mandated exposure limits between 5 mg/M³ and 15 mg/M³ on a TWA basis for the total and respirable forms of these materials and their fumes.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Product is metallic shapes with no odor. As shipped, the product is considered non-hazardous. Dust and particulate matter may cause irritation of eyes, skin, mucous membranes, and respiratory tract. Wear appropriate personal protective equipment. Keep individuals not involved in the clean-up out of the area. Pick up released product with appropriate implements and return to original container if reusable. If not reusable, place in appropriate containers for disposal. Although the product itself is non-hazardous, material collected during clean-up operations may be contaminated and should be treated as hazardous unless specific testing, including TCLP, shows the collected material to be non-hazardous. Product is not expected to present an environmental hazard.

POTENTIAL HEALTH EFFECTS:

In its manufactured and shipped state the product is considered non-hazardous. Processing, including melting, casting, machining, forging, cutting, grinding, or welding, may result in the generation of dusts, fumes, or particulate matter which have potential health effects discussed below.

Eye:	Vapors, dusts, fumes, and particulate matter may cause irritation of the eyes.
Skin Contact:	Vapors, dusts, fumes, and particulate matter may cause mechanical irritation of the skin.
Skin Absorption:	Not known to be absorbed through the intact skin.
Ingestion:	Not expected to be an important route of entry into the body. Ingestion of large quantities of product dusts or particulate matter may cause gastric discomfort or distress.
Inhalation:	Vapors, dusts, fumes, and particulate matter may cause irritation of the mucous membranes and respiratory tract. Inhalation of high concentrations of freshly formed metal oxide fumes may cause "Metal Fume Fever". It is characterized by fever, chills, sore muscles and joints, and a metallic taste in the mouth. The condition is self-limiting and generally resolves in 24 to 48 hours.