SAFETY DATA SHEET

1. Identification

Product Identifier **ALUMINUM SKIM AND DROSS**

other means of Identification

SDS number KWAR-22

Version# 01

Revision date Not Applicable

other means of identification

Synonyms Aluminum * Skim * Skim blocks * Black dross * Bulk dross* Chunky dross * Dross dust * Dross pellets * "Grizzly" dross * Salt dross * Trench metal* Écumes * Écumes d'aluminium * Écumes de fonderie * Crasses de fonderie * Écumes du centre de coulee * Écumes de fournaises * Scorie * Kemtherm * Dross * By-Pass Dross* Course Dross * Dross Fines* Dross Dust

Recommended use Waste, Reuse, Recycling

Recommended restrictions For industrial use only.

Manufacturer/Importer/Supplier/Distributor Information

Manufacturer

Kaiser Aluminum Warrick LLC
4000 W. State Route 66
Newburgh, IN 47629

Emergency Information CHEMTREC: +1-703-527-3887 +1-800-424-9300 (24 Hour Emergency Telephone, multiple languages spoken); Kaiser Warrick: +1-877-335-9886 (24 Hour Emergency Telephone, only English spoken)

Website For a current Safety Data Sheet, refer to Kaiser Aluminum website: https://www.kaiseraluminum.com/customer-portal/safety-data-sheets/

2. Hazard(s) identification

Potential health effects

The following statements summarize the health effects generally expected in cases of overexposures. User specific situations should be assessed by a qualified Individual. Additional health information can be found in Section 11.

Physical hazards	Substances and mixtures which, in contact with water, emit flammable gases	Category 3
Health hazards	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2
	Reproductive toxicity	Effects on or via lactation
	Specific target organ toxicity, repeated exposure	Category 1
Environmental hazards	Not classified.	
OSHA defined hazards	Combustible dust	

Label elements

Signal word Danger

Hazard statement In contact with water releases flammable gas. Causes skin irritation. Causes serious eye irritation. May cause an allergic skin reaction. Suspected of causing cancer by inhalation.

Precautionary statement

Prevention Protect from moisture. Obtain special instructions before use. Do not breathe dust/fume/gas/mist/vapor spray. Wear protective gloves/protective clothing/eye protection.

Response In case of fire: Use metal extinguishing media Class D for extinction. IF exposed or concerned: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. If skin irritation or rash occurs: Get medical advice/attention. If experiencing respiratory symptoms: Call a POISON CENTER/doctor.

Storage Keep dry. Protect from moisture. Do not allow chips, fines or dust to contact water, particularly in enclosed areas.

If wetted, remove to open area.

Disposal Not available.

Hazard(s) not otherwise classified (HNDC) Reacts with water to release toxic gas.

Supplemental information None.

Specific hazards Non-combustible as supplied. Hot dross dust (above 1290'F or 700'C) may ignite readily.

Explosion/fire hazards may be present when (See Sections 5, 7 and 1O for additional information):
- Dross is heated above 1290°F (700°C).
- Small chunks, dust or fines in contact with water can generate flammable or toxic gases. These gases could present an explosion hazard in confined or poorly ventilated spaces.
- Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide).

Direct contact: Can cause severe irritation of the eyes and of the skin. Dust Can cause irritation of the upper respiratory tract.
Health effects of additional compounds which may be formed on contact with water: Contact with water can generate ammonia, phosphine, hydrogen and ammonia. Vapors: Can cause severe irritation of the eyes, skin and respiratory tract. Acute overexposures: Can cause difficulty breathing and the accumulation of fluid in the lungs.

3. Composition/information on ingredients

Composition comments Complete composition Is provided below and may include some components classified as non-hazardous.

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Aluminum		7429-90-5	20-80
Aluminum Oxide (non-fibrous)	Alumina	1344-28-1	10-50
Cryolite (Trisodium hexafluoraluminate)		13775-53-6	0-15
Metal chloride salts		CAS Not Available	0-15
Metal nitrides		CAS Not Available	0-15
Magnesium oxide		1309-48-4	0-10
Silicon		7440-21-3	0-10
Zinc		7440-66-6	0-8
Magnesium		7439-95-4	0-5
Iron		7439-89-6	0-2
Manganese		7439-96-5	0-2
Chromium		7440-47-3	<1
Copper		7440-50-8	0-1
Metal carbides		CAS Not Available	0-1
Tin		7440-31-5	<1
Nickel		7440-02-0	<1,0

Additional Information	Aluminum dross is rich in metal content when it is skimmed off the molten metal. Variations In container type from which It Is removed and different procedures used following its removal may result In a product whose composition varies within the wide ranges shown above. While lead is not Intentionally added to this mixture, it could potentially enter through the recycle stream. Additional compounds which may be formed on contact with water are listed In Section 8.

4. First-aid measures

Eye contact	Rinse eyes with plenty of water or saline for at least 15 minutes. Consult a physician immediately.
Skin contact	Get medical attention if irritation develops and persists. Wash contaminated clothing before reuse. Wash with soap and water for at least 15 minutes.
Inhalation	Remove to fresh air. Check for clear airway, breathing, and presence of pulse. If breathing is difficult, provide oxygen. Loosen any tight clothing on neck or chest. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.
Ingestion	Not likely, due to the form of the product.
Most Important symptoms/effects, acute and delayed	Dust and fumes from processing: Can cause irritation of the upper respiratory tract. Chronic exposure: Can cause reduction in the number of red blood cells, skin abnormalities, respiratory sensitization, scarring of the lungs, central nervous system damage, secondary Parkinson's disease and reproductive harm in males. Health effects of additional compounds which may be formed on contact with water: Inhalation: Can cause difficulty breathing and the accumulation of fluid in the lungs (pulmonary edema}. Chronic exposure: Can cause lung damage and liver damage.
Medical conditions aggravated by exposure	Asthma, chronic lung disease, Secondary Parkinson's disease and skin rashes.
Indication of immediate medical attention and special treatment needed	Symptoms may be delayed.
General information	In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

5. Fire-fighting measures

Suitable extinguishing media	Use Class D extinguishing agents on fines, dust or molten metal. Apply extinguishing media carefully to avoid creating airborne dust.
Unsuitable extinguishing media	DO NOT USE water In fighting fires around molten metal. These fire extinguishing agents will react with the burning material. DO NOT USE halogenated extinguishing agents on small chunks, dust or fines.
Specific hazards arising from the chemical	Non-combustible. May be a potential hazard under the following conditions: Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide}. Moisture entrapped by molten metal can be explosive. Contact of molten aluminum with certain metal oxides can initiate a thermite reaction. Finely divided metals (e.g., powders or wire) may have enough surface oxide to produce thermlte reactions/explosions. Contact with water can generate flammable and toxic gases (ammonia, phosphine, hydrogen and methane}. Hot dross dust (above 1290°F or 700°C} may ignite readily. Small chunks, dust or fines in contact with water can generate flammable or toxic gases. These gases could present an explosion hazard In confined or poorly ventilated spaces.
Special protective equipment and precautions for firefighters	Firefighters should war NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.
Fire fighting equipment/instructions	Use Class D extinguishing agents on fines, dust or molten metal. Use gentle surface application of Class D extinguishing agent or dry inert granular material (e.g., sand} to cover and ring the burning material. Keep water, halogenated extinguishing agents and foam away from the molten material. If impossible to extinguish, protect surroundings and allow fire to burn itself out. As last resort, use a coarse water spray to flood the chunks.
General fire hazards	Non-combustible as supplied. Contact with water can generate flammable and toxic gases (ammonia, phosphine, hydrogen and methane}. Hot dross dust (above 1290°F or 700°C) may ignite readily. These gases could present an explosion hazard in confined or poorly ventilated spaces.
Explosion data	
Sensitivity to mechanical Impact	Not sensitive.

Sensitivity to static discharge	Take precautionary measures against static discharges when there Is a risk of dust explosion.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Use personal protection recommended in Section 8 of the SDS. Molten, heated and cold aluminum look alike; do not touch unless you know It is cold. Avoid breathing dust/fume/gas/mist/vapors/spray. Ensure adequate ventilation. Avoid generating dust. Avoid contact with skin and eyes. Avoid contact with sharp edges or heated metal.

Personal precautions, protective equipment and emergency procedures

For emergency responders	Keep unnecessary personnel away. Molten, heated and cold aluminum look alike; do not touch unless you know ii is cold. Ventilate closed spaces before entering them. Do not inhale vapor, fumes, or dust from the spilled material. Avoid generating dust. Avoid contact with skin and eyes. Avoid contact with sharp edges or heated metal.
Evacuation procedures	Keep unnecessary personnel away.
Methods and materials for containment and cleaning up	Protect from water run-on including precipitation. Collect scrap for recycling. If molten: Use dry sand to contain the flow of material. All tooling (e.g., shovels or hand tools) and containers which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. Allow the spill to cool before remelting as scrap. Use dry cleanup procedures. Avoid dust formation. Collect in containers and seal securely.
Environmental precautions	Avoid release to the environment.

7. Handling and storage

Handling	Avoid contact with sharp edges or heated metal. Avoid generating dust. Avoid contact with skin and eyes. Avoid contact with sharp edges or heated metal. Hot and cold aluminum are not visually different. Keep material dry. If wetted, remove to open area. Use with adequate ventilation. Wash hands thoroughly after handling. Use personal protection recommended in Section 8 of the SDS. Do not allow small chunks, fines or dust lo contact water, particularly in enclosed areas. Prior to shipment, material should be dry and cooled to ambient temperature. Shipment should be In closed containers, covered trailers, or covered hopper cars.
Storage	Keep material dry. If wetted, remove lo open area. Storage of material in unventilated containers, tanks or railcars can allow toxic or flammable gases to accumulate.
Requirements for Processes Which Generate Dusts or Fines	Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic precipitators must not be used, unless specifically approved for use with flammable/explosive dusts. Dust collection systems must be dedicated to aluminum dust only and should be clearly labeled as such. Do not co-mingle fines of aluminum with fines of iron, iron oxide (rust) or other metal oxides.

Requirements for Remelting of Scrap Material or Ingot

Molten metal and water can be an explosive combination. The risk is greatest when there is sufficient molten metal to entrap or seal off the water. Water and other forms of contamination on or contained in scrap or remelt ingot are known to have caused explosions in melting operations. While the products may have minimal surface roughness and internal voids, there remains the possibility of moisture contamination or entrapment. If confined, even a few drops of water can lead to violent explosions.

All tooling, containers, molds and ladles which come In contact with molten metal must be preheated or specially coated, rust free and approved for such use. Any surfaces that may contact molten metal (e.g., concrete) should be specially coated.

Drops of molten metal In water (e.g. from plasma arc cutting), while not normally an explosion hazard, can generate enough flammable hydrogen gas to present an explosion hazard. Vigorous circulation of the water and removal of the particles minimize the hazards.

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

- Inspect all materials prior to furnace charging and completely remove surface contamination such as water, Ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage.
- Store materials in dry, heated areas with any cracks or cavities pointed downwards.
- Preheat and dry large items adequately before charging into a furnace containing molten metal. This is typically done by use of a drying oven or homogenizing furnace. The drying cycle should bring the metal temperature of the coldest Item of the batch to 400°F (200°C) and then hold at that temperature for 6 hours.

Thermlte explosions have been reported when aluminum alloys were melted In furnaces used for alloying with lead, bismuth or other metals with low melting temperatures. These metals, when added as high purity ingots, can seep through cracks in furnace liners and become oxidized. During subsequent melts in the furnace, molten aluminum can contact these metal oxides resulting in a thermite explosion.

8. Exposure controls/personal protection

Occupational exposure limits

U.S. -OSHA

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	5 mglm3	Respirable fraction
		15 mg/m3	Total dust
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	5 mg/m3	Respirable fraction.
		15mg/m3	Total dust.
Chromium (CAS 7440-47-3)	TWA	1 mg/m3	
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.1 mg/m3	Fume.
Cryolite (Trisodium hexafluoroaluminate) (CAS 13775-53-6)	TWA	2.5 mg/m3	(as F)
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m3	Fume
Nickel (CAS 7440-02-0)	TWA	1 mg/m3	
Silicon (CAS 7440-21-3)	TWA	5mg/m3	Respirable fraction.
		15 mg/m3	Total dust

Decomposition	Type	Value
Ammonia (CAS 7664-41-7)	TWA	35 mglm3
		50 ppm
Phosphine (CAS 7803-51-2)	TWA	0.4 mg/m3
		0.3 ppm

US. OSHA Table Z-1 Limits **for Air Contaminants (29 CFR 1910.1000)**

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	PEL	5 mg/m3	Resplrable fraction.
Magnesium oxide (CAS 1309-48-4)	PEL	15 mg/m3	Total particulate.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Tin (CAS 7440-31-5)	PEL	2mg/m3	

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	5mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Resplrable fraction.
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	5mg/m3	Resplrable fraction.
		15 mg/m3	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.
Magnesium oxide (CAS 1309-48-4)	TWA	5mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.

ACGIH

Components	Type	Value	Form
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	1 mg/m3	Respirable fraction, as Al
Copper (CAS 7440-50-8)	TWA	1 mg/m3	(Dust and Mist)
		0.2 mglm3	Fume
Cryolite (Trisodium hexafluoroaluminate) (CAS 13775-53-6)	TWA	2.5 mg/m3	(as F)
Manganese (CAS 7439-96-5)	TWA (inhalable fraction)	0.2 mg/m3	(Inhalable fraction)
	TWA (respirable fraction)	0.02 mg/m3	(respirable fraction)

US ACGIH Threshold Limit Values: Short Term Exposure Limit (STEL): mglm3 & ppm

Decomposition	Type	Value
Ammonia (CAS 7664-41-7)	STEL	35 ppm
Phosphine (CAS 7803-51-2)	STEL	1 ppm

US ACGIH Threshold Limit Values: Time Weighted Average (TWA): mg/m3 & ppm

Decomposition	Type	Value
Ammonia (CAS 7664-41-7)	TWA	25 ppm
Phosphine (CAS 7803-51-2)	TWA	0.3 ppm

US ACGIH Threshold Limit Values: Time Weighted Average (TWA): mg/m3, non-standard units

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	1 mglm3	Respirable fraction.
Chromium (CAS 7440-47-3)	TWA	0.5 mglm3	
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mglm3	Fume.
Magnesium oxide (CAS 1309-48-4)	TWA	10 mg/m3	Inhalable fraction.
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.

US ACGIH Threshold Limit Values: Time Weighted Average (TWA): mglm3, non-standard units

Components	Type	Value	Form
Nickel (GAS 7440-02-0)	TWA	1.5mg/m3	Inhalable fraction.
Tin {GAS 7440-31-5)	TWA	2 mg/m3	

Components	Type	Value	Form
Aluminum {GAS 7429-90-5)	TWA	3 mg/m3	Respirable fraction
		10 mg/m3	Total dust
Aluminum oxide (non-fibrous) (GAS 1344-28-1)	TWA	3 mg/m3	Respirable fraction.
		10 mg/m3	Total dust.
Cryolite (Trisodium hexafluoroalumlnate) (GAS 13775-53-6)	TWA	0.5mg/m3	(as F)
Manganese (GAS 7439-96-5)	TWA	0.05 mg/m3	Total dust.
		0.02 mg/m3	Resplrable fraction.
Nickel (GAS 7440-02-0)	TWA	1 mg/m3	

General Personnel who handle and work with molten metal should utilize primary protective clothing like polycarbonate face shields, fire resistant tapper's jackets, neck shades (snoods), leggings, spats and similar equipment to prevent burn injuries. In addition to primary protection, secondary or day-to-day work clothing that is fire resistant and sheds metal splash is recommended for use with molten metal. Synthetic materials should never be worn even as secondary clothing (undergarments).

Appropriate engineering controls Use with adequate explosion-proof ventilation to meet the limits listed in Section 8.

Individual protection measures, such as personal protective equipment

Eye/face protection Use tight filling goggles if excessive levels of dust are generated. If molten: Goggles/face shield are recommended.

Skin protection

Hand protection The need for personal protective equipment (gloves) should be based upon a hazard assessment and recommendations from health / safety professionals. Wear appropriate gloves to avoid any skin injury.

other The need for personal protective equipment should be based upon a hazard assessment and recommendations from health/ safety professionals. Wear appropriate gloves and clothing to avoid direct skin contact.

Respiratory protection Oust and fumes from processing: Use NIOSH-approved respiratory protection as specified by an Industrial Hygienist or other qualified professional if concentrations exceed the limits listed In Section 8. Suggested respiratory protection: N95, Full face mask for ammonia, Supplied air respirators for phosphine.

Thermal hazards Flame retardant protective clothing is recommended. Contact with molten material can cause thermal burns. When material is heated, wear gloves to protect against thermal burns.

General hygiene considerations Handle in accordance with good industrial hygiene and safety practice. When using, do not eat, drink or smoke.

Control parameters Follow standard monitoring procedures.

Environmental exposure controls Do not allow to enter drains, sewers or watercourses.

9. Physical and chemical properties

Form Solid, dust to large chunks.

Color Silver to gray.

Odor Slight ammonia odor.

Odor threshold Not determined

pH < 11.5 (saturated aqueous solution)

Density 2.30 - 3.00 g/cm3

Melting point/freezing point 899.6 - 1202 'F (482 - 650 'C) (metal)

Initial boiling point and boiling range	Not determined
Flash point	Not applicable
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit – upper (%)	Not applicable
Flammability limit - lower (%)	Not applicable
Explosive properties	Not explosive. Dust can form an explosive mixture in air. If small particles are generated during further processing, handling or by other means, may form combustible dust concentrations in air.
Dust explosion properties	
St class	Strong explosion.
Vapor pressure	Not applicable
Vapor density	Not applicable
Relative density	Not determined
Solubllity(ies)	Slight
Partition coefficient (n-octanol/water)	Not applicable.
Auto-Ignition temperature	Not applicable
Decomposition temperature	Not applicable
Viscosity	Not available.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable under normal conditions of use, storage, and transportation as shipped.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Small chunks, dust or fines and molten metal are considerably more reactive with the following: • Water: Slowly generates flammable/explosive hydrogen gas and heat. Generation rate is greatly increased with smaller particles (e.g., fines and dusts). Molten metal can react violently/explosively with water or moisture, particularly when the water is entrapped. • Heat: Oxidizes at a rate dependent upon temperature and particle size.
Incompatible materials	Small chunks, dust or fines and molten metal are considerably more reactive with the following: • Strong oxidizers: Violent reaction with considerable heat generation. Can react explosively with nitrates (e.g., ammonium nitrate and fertilizers containing nitrate) when heated or molten. • Acids and alkalis: Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly Increased with smaller particles (e.g., fines and dusts). • Halogenated compounds: Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided or molten aluminum. • Iron oxide (rust) and other metal oxides (e.g., copper and lead oxides): A violent thermlte reaction generating considerable heat can occur. Reaction with aluminum fines and dusts requires only very weak ignition sources for Initiation. Molten aluminum can react violently with iron oxide without external ignition source. • Iron powder and water: Explosive reaction forming hydrogen gas when heated above 1470'F (800'C). Thermite explosions have been reported when aluminum alloys were melted in furnaces used for alloying with lead, bismuth or other metals with low melting temperatures. These metals, when added as high purity ingots, can seep through cracks in furnace liners and become oxidized. During subsequent melts in the furnace, molten aluminum can contact these metal oxides resulting in a thermite explosion.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Health effects associated with Ingredients

Alumina (aluminum oxide): Low health risk by Inhalation. Generally considered to be biologically inert.

Aluminum dust/fines and fumes: Low health risk by Inhalation. Generally considered to be biologically inert.

Cryolite: Can cause irritation of eyes, mucous membranes, skin and upper respiratory tract. Chronic overexposures: Associated with asthma. Can cause fluoride deposition in bones and cartilage (fluorosis) as evidenced by x-ray changes and can be accompanied by stiffness of the Joints. May cause harm to breastfed babies.

Metal chloride salts: Can cause Irritation of the eyes, skin and gastrointestinal tract. Ingestion: can cause diarrhea, loss of appetite, low blood pressure (hypotension), central nervous system effects (dizziness, nausea and loss of coordination) and respiratory arrest.

Silicon (inert dusts): Chronic overexposures: Can cause chronic bronchitis and narrowing of airways.

Copper dust/mists: Can cause irritation of the eyes, mucous membranes, skin, and respiratory tract. Chronic overexposures: Can cause reduction In the number of red blood cells (anemia), skin abnormalities (pigmentation changes) and hair discoloration.

Tin (dust or fume): Chronic overexposures: Can cause benign lung disease (stannosis).

Nickel dust and fume: Can cause irritation of eyes, skin and respiratory tract. Eye contact: Can cause inflammation of the eyes and eyelids (conjunctivitis). Skin contact: Can cause sensitization and allergic contact dermatitis. Chronic overexposures: Can cause perforation of the nasal septum, inflammation of the nasal passages (sinusitis), respiratory sensitization, asthma and scarring of the lungs (pulmonary fibrosis). Nickel alloys IARC/NTP: Reviewed and not recommended for listing by NTP. Listed as possibly carcinogenic to humans by IARC (Group 2B).

Chromium dust and fumes: Can cause irritation of eye, skin and respiratory tract.
Metallic chromium and trivalent chromium: Not classifiable as to their carcinogenicity to humans by IARC.

Health effects associated with compounds formed during processing

Ammonia gas/vapor: Can cause severe irritation of eyes, skin and respiratory tract. Acute overexposure: Can cause throat spasms swelling of the throat, obstruction of the upper airway, constriction of the bronchial tubes and the accumulation of fluid in the lung (pulmonary edema). Chronic overexposures: Can cause lung damage.

Phosphine: Can cause irritation of eyes and respiratory tract. Acute overexposures: Can cause headache, vomiting, abdominal pain, cough, drowsiness (narcosis), difficulty breathing, malaise, central nervous system effects (nausea, dizziness and loss of coordination), the accumulation of fluid in the lungs (pulmonary edema), seizures, coma and death. Chronic overexposures: Can cause liver damage. Additional Information: Associated with an increased risk of cancer of the blood forming organs.

Information on likely routes of exposure

Eye contact	Direct contact: Can cause severe irritation.
Skin contact	Direct contact: Can cause irritation especially when wet.
Inhalation	Dust: Can cause irritation of the upper respiratory tract. Chronic exposure: Can cause reduction in the number of red blood cells (anemia), skin abnormalities (pigmentation changes), respiratory sensitization, scarring of the lungs (pulmonary fibrosis) central nervous system damage, secondary Parkinson's disease and reproductive harm in males. Health effects of additional compounds which may be formed on contact with water: Vapors: Can cause severe irritation of the respiratory tract. Acute exposure: Can cause difficulty breathing and the accumulation of fluid In the lungs (pulmonary edema). Chronic exposure: Can cause lung damage and liver damage.
Ingestion	Not likely, due to the form of the product.
Symptoms related to the physical, chemical and toxicological characteristics	Chronic exposure Inhalation Can cause reduction in the number of red blood cells, skin abnormalities, respiratory sensitization, scarring of lungs, central nervous system damage, secondary Parkinson's disease, reproductive harm in males and lung cancer. Acute exposure: Can cause difficulty breathing and the accumulation of fluid in the lungs. Chronic exposure can cause lung damage and liver damage. Dust and fumes from processing: Irritating to eyes, respiratory system and skin. Contains nickel. May produce an allergic reaction. May cause sensitization by inhalation. Health effects of additional compounds which may be formed on contact with water: Causes severe Irritation of eyes, skin and mucous membranes.

Information on toxicological effects

Components	Species	Test Results
Aluminum (CAS 7429-90-5)		
Acute		
Oral		
LD50	Rat	> 2000 mg/kg
Aluminum oxide (non-fibrous) (CAS 1344-28-1)		
Acute		
Inhalation		
LC50	Rat	> 2.3 mg/l
		7.6 mg/l
Oral		
LD50	Rat	> 5000 mg/kg
Cryolile (Trisodium hexafluoroalumlnate) (CAS 13775-53-6)		
Acute		
Dermal		
AT_LD50	Rat	> 2000 mg/kg
Oral		
AT_LD50	Rat	> 1600 mg/kg
Nickel (CAS 7440-02-0)		
Acute		
Oral		
LD50	Rat	> 9000 mg/kg
Zinc (CAS 7440-66-6)		
Acute		
Oral		
LD50	Rat	630 mg/kg

Decomposition	Species	Test Results
Ammonia (CAS 7664-41-7)		
Acute		
Inhalation		
LC50	Cat	0.746 mg/l, 1 Hours
	Mouse	7.105 mg/l, 10 Minutes
		3.36 mg/l, 1 Hours
		3.31 mg/l, 2 Hours
	Rabbit	7.05 mg/l, 1 Hours
	Rat	4000 ppm, 1 Hours
		2000 ppm, 4 Hours
		7.6 mg/l, 2 Hours
		5.1 mg/l, 1 Hours
Oral		
LD50	Rat	350 mg/kg
Phosphine (CAS 7803-51-2)		
Acute		
Inhalation		
LC50	Mouse	26 ppm, 4 Hours
	Rat	20 ppm, 1 Hours
		10 ppm, 4 Hours

Acute toxicity Harmful by inhalation. May cause irritation of respiratory tract.

Skin corrosion/Irritation Non-corrosive. Causes severe irritation of eyes, skin and mucous membranes.

Serious eye damage/eye Irritation Dust and fume from processing: Dust in the eyes: Causes severe eye irritation.

Respiratory or skin sensitization

Respiratory sensitization May cause sensitization by inhalation. Dust and fumes from processing: Contains nickel. May produce an allergic reaction.

Skin sensitization Direct contact may irritate. Contains nickel. May produce an allergic reaction.

Germ cell mutagenlclty Not classified.

Carcinogenicity Dust and fume from processing: Can present a cancer hazard (Nickel).

IARC Monographs. Overall Evaluation of Carcinogenicity

Chromium (CAS 7440-47-3)	3 Not classifiable as to carcinogenicity to humans.
Nickel (CAS 7440-02-0)	1 Carcinogenic to humans.

US OSHA Hazard Categories (10)

Not regulated.

US OSHA Hazard Categories (9)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Nickel (CAS 7440-02-0)	Known To Be Human Carcinogen.
	ReasonablyAnticipated to be a Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Reproductive toxicity Dust and fume from processing: Can present a reproductive hazard for males (Manganese).

Routes of exposure Inhalation. Skin contact. Eye contact.

Specific target organ toxicity - single exposure Dust and fumes from processing: Respiratory tract irritation.

Specific target organ toxicity - repeated exposure Chronic overexposures:

Aspiration hazard Not applicable.

Chronic effects Causes damage to organs through prolonged or repeated exposure. Dust and fumes from processing: Can cause reduction In the number of red blood cells, skin abnormalities, respiratory sensitization, scarring of the lungs, central nervous system damage, secondary Parkinson's disease and reproductive harm in males.

Further information Symptoms may be delayed.

12. Ecological information

Ecotoxicity No data available for this product.

Components		Species	Test Results
Chromium (CAS 7440-47-3)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	0.01 - 0.7 mgn, 48 hours
Fish	LC50	Carp (Cyprinus carplo)	14.3 mgn, 96 hours
Copper (CAS 7440-50-8)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	0.036 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	0.0319 - 0.0544 mg/l, 96 hours
Cryollte (Trisodium hexafluoroaluminate) (CAS 13775-53-6)			
Aquatic			
Algae	EC50	Algae	8.8 mg/l, 72 hours
Crustacea	EC50	Daphnla	5 mg/l, 48 hours
Fish	LC50	Brown trout (Salmo trutta)	125 mg/l, 48 hours
		Freshwater fish	> 100 mgn, 96 hours
Iron (CAS 7439-89-6)			
Aquatic			
Crustacea	LC50	Cockle (Cerastoderrna edule)	100 - 330 mgn, 48 hours

Components		Species	Test Results
		Common shrimp, sand shrimp (Crangon crangon)	33 - 100 mg/l, 48 hours
Fish	LC50	Channel catfish (Ictalurus punctatus)	> 500 mg/l, 96 hours
Manganese (GAS 7439-96-5)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	40 mgn, 48 hours
Nickel (GAS 7440-02-0)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna) hours	1 mg/l, 48
		Fathead minnow (Pimemphales promelas)	
Fish	LC50		2.923 mg/l, 96 hours
Zinc (GAS 7440-66-6)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	2.8 mg/l, 48 hours
Fish	LC50	Rainbow trout, Donaldson trout (Oncorhynchus mykiss)	0.56 mg/l, 96 hours

Decomposition		Species	Test Results
Ammonia (GAS 7664-41-7)			
Aquatic			
Fish	LC50		0.43 - 0.47 mg/l, 96 hours
		Chinook salmon (Oncorhynchus tshawytscha)	

Persistence and degradability Not inherently biodegradable.

Bioaccumulatlve potential The product does not contain any substances expected to be bioaccumulating.

Mobility In soil Not considered mobile.

Mobility In general Not considered mobile.

Other adverse effects None known.

13. Disposal considerations

Disposal instructions Reuse or recycle material whenever possible. If reuse or recycling is not possible, disposal must be made according to local or governmental regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Waste codes Status must be determined at the point of waste generation. If material is disposed as a waste, it must be characterized under RCRA according to 40 CFR, Part 261, or state equivalent in the U.S. TCLP testing is recommended for chromium, lead, and selenium.

Waste from residues/ unused products Dispose of in accordance with local regulations.

Contaminated packaging Dispose of in accordance with local regulations.

14. Transport information

General Shipping Information

Basic Shipping Information

ID number UN3170

Proper shipping name Aluminum remelting by products

Hazard class 4.3

Packing group III

General Shipping Notes

- Shipment Prohibited Wet or Hot.
- The Import/export HTSUS (Harmonized Tariff Schedule) subheading 2620.40.0060 applies (Knoxville, TN).
- The import/export HTS (Harmonized Tariff Schedule) code given above is the United States HTS. Other country specific HTS codes may apply. If available, more information on the HTS codes will be provided on country specific Material Safety Data Sheets.
- Standard Transportation Commodity Code: 49-163-22.
- MUST BE CONFIRMED: The OECD (Organization for Economic Cooperation & Development) Control system for Transfrontier Movements of Wastes Destined for Recovery Operations [C(2001)/107 Final version] refers to the Basel Convention, which classifies Aluminum Skim & Dross (or Skim), excluding Salt as B1100. However, in Annex IX of the Basel Convention and according to Chapter II B(6)(c) of the OECD, wastes that exhibit a characteristic (Annex III of Basel/ Appendix 2 of OECD, respectively) are to be managed as a hazardous waste and are to be subject to the Amber control procedures. Aluminum Skim & Dross meets the characteristic of H4.3, therefore is to be managed under Amber control procedures and as a hazardous waste per the Basel Convention. OECD code to be confirmed with competent authorities.
- For UN 3170, Kaiser Aluminum Warrick the following PSN Internal convention: a) skim, dross and salts are designated as Aluminum remelting by-products no matter the source, and b) SPL and SPL contaminated materials are designated as Aluminum smelting by-products.

DOT Specific Notes

- Per United States transportation regulations 49 CFR 173.241(c), sift-proof, non-Department of Transportation specification, portable tanks suitable for transport of liquids (including totes) are authorized for Packing Group III solids in the domestic U.S.
- See Special Provision B115 for sift-proof, non-specification bulk packaging provisions in the U.S.
- Insert "RQ & Zinc & Nickel" reference when in packages greater than 2000 lbs. of pieces of metal having a diameter smaller than 100 micrometers (0.004 inches).
- Insert "RQ & Zinc & Nickel" reference when the Zinc & Nickel concentration by weight in the dross is greater than 20,000ppm (2%) and 2,000ppm (0.2%) respectively.
- In the U.S., loading and utilizing non-DOT specification integral gaskets, liners, non-structural additional packaging materials, bins, packaging, flexible bags, drums, etc. may be considered "non-structural additional packaging components" only if necessary to render a bulk packaging (e.g.; Trailer, rail car, bulk bin) a sift-proof closed vehicle. Shipping papers for units so loaded should reflect one unit(e.g.; 1-trailer, 1 rail car, etc), and not the number of packaging pieces or components utilized-even if an LTL or LCL. RQ's when applicable, are to be based on the net weight of the load. Marking, labeling and placarding rules are applicable to the vehicle and not the additional packaging components (RE: DOT May 2, 1994 interpretation).

Disclaimer

This section provides basic classification information and, where relevant, information with respect to specific modal regulations, environmental hazards and special precautions. Otherwise, it is presumed that the information is not available/not relevant

15. Regulatory information

US federal regulations

In reference to Title VI of the Clean Air Act of 1990, this material does not contain nor was ii manufactured using ozone-depleting chemicals.
All electrical equipment must be suitable for use In hazardous atmospheres involving aluminum powder in accordance with 29 CFR 1910.307. The National Electrical Code, NFPA 70, contains guidelines for determining the type and design of equipment and Installation which will meet this requirement.
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpart D)

Zinc (CAS 7440-66-6)	1.0 % One-Time Export Notification only.

CERCLA Hazardous Substance List (40 CFR 302.4)

Chromium (CAS 7440-47-3)	Listed.
Copper (CAS 7440-50-8)	Listed.
Manganese (CAS 7439-96-5)	Listed.
Nickel (CAS 7440-02-0)	Listed.
Zinc (CAS 7440-66-6)	Listed.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US OSHA Hazard Categories (9)

Not regulated.

US OSHA Hazard Categories (10)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories	Immediate Hazard - Yes	If particulates/fumes generated during processing.
	Delayed Hazard - Yes	If particulates/fumes generated during processing.
	Fire Hazard - No	
	Pressure Hazard - No	
	Reactivity Hazard - Yes	If molten

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity	Threshold planning quantity	Threshold planning quantity, lower value	Threshold planning quantity, upper value
Ammonia	7664-41-7	100	500lbs		
Phosphine	7803-51-2	100	500lbs		

SARA311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Aluminum	7429-90-5	20-80
Zinc	7440-66-6	0-8
Manganese	7439-96-5	0-2
Copper	7440-50-8	0-1

US state regulations

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

US" California Proposition 65 - CRT: Listed date/Carcinogenic substance

Nickel (CAS 7440-02-0) Listed: May 7, 2004

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

"A "Yes" indicates that all components of this product comply with the Inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

SDS Status Origination date: April 1, 2021.

Further Information Refer to NFPA 654, Standard for Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids, for safe handling.

Disclaimer Kaiser Aluminum Warrick cannot anticipate all conditions under which this Information and its product, or the products of other manufacturers in combination with its product, may be used. It is the responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available

Other Information

• Guide to Occupational Exposure Values 2012, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
• NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, September 2005.
• expub, Expert Publishing, LLC., www.expub.com,
• Ariel, 3E Company, www.3Ecompany.com
• Aluminum Association's Bulletin F-1, "Guidelines for Handling Aluminum Fines Generated During Various Aluminum Fabricating Operations." The Aluminum Association, 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209, www.alumlnum.org.
• Aluminum Association, "Guidelines for Handling Molten Aluminum, The Aluminum Association, 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209, www.aluminum.org.
• NFPA 484, Standard for Combustible Metals (NFPA phone: 800-344-3555)
• NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids
• NFPA 70, Standard for National Electrical Code (Electrical Equipment, Grounding and Bonding)
• NFPA 77, Standard for Static Electricity

Key/Legend:

ACGIH	American Conference of Governmental Industrial Hygienists
AICS	Australian Inventory of Chemical Substances
CAS	Chemical Abstract Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CPR	Cardio-pulmonary Resuscitation
DOT	Department of Transportation
DSL	Domestic Substances List (Canada)
EC	Effective Concentration
ED	Effective Dose
EINECS	European Inventory of Existing Commercial Chemical Substances
ENCS	Japan - Existing and New Chemical Substances
EWC	European Waste Catalogue
EPA	Environmental Protective Agency
IARC	International Agency for Research on Cancer
LC	Lethal Concentration
LD	Lethal Dose
MAK	Maximum Workplace Concentration (Germany) "maximale Arbeitsplatz-Konzentration"
NDSL	Non-Domestic Substances List (Canada)
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PIN	Product Identification Number
PMCC	Pensky Marten Closed Cup
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SIMDUT	Système d'Information sur les Matières Dangereuses Utilisées au Travail
STEL	Short Term Exposure Limit
TCLP	Toxic Chemicals Leachate Program
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act TWA Time Weighted Average
WHMIS	Workplace Hazardous Materials Information System
m	meter,
cm	centimeter,
mm	millimeter,
in	inch,
g	gram,
kg	kilogram,
lb	pound,
µg	microgram,
ppm	parts per million,
ft	feet*** End of SDS ***

ALUMINUM SKIM AND DROSS

KWAR-22

Hazard statement

In contact with water releases flammable gas. causes skin irritation. Causes serious eye irritation. May cause an allergic skin reaction. Suspected of causing cancer by inhalation

Precautionary statement

Prevention

Protect from moisture. Obtain special instructions before use. Do not breathe dust/fume/gas/mist/vapors/spray. Wear protective gloves/protective clothing/eye protection/face protection.

Response

In case of fire: Use metal extinguishing media Class D for extinction. IF exposed or concerned: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. If skin irritation or rash occurs: Get medical advice/attention. If experiencing respiratory symptoms: Call a POISON CENTER/doctor.

Storage

Keep dry. Protect from moisture. Do not allow chips, fines or dust to contact water, particularly in enclosed areas.

If wetted, remove to open area.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations. Reuse or recycle material whenever possible.

Danger

Supplemental information

Reacts with water to release toxic gas.

FIRE FIGHTING MEASURES:
Non-combustible. Small chips, fine turnings and dust from processing may be readily ignitable. Hot dross dust (above 1290°F or 700°C) may ignite readily. Product may form explosive dust/air mixture if high concentration of product dust is suspended in air.
Use Class D extinguishing agents on fines, dust or molten metal.
Use coarse water spray on chunks.
DO NOT USE halogenated extinguishing agents on small chips/fines.
DO NOT USE water in fighting fires around molten metal.

IN CASE OF SPILL:
Collect scrap for recycling.
Keep material dry. Contact with water can generate flammable and toxic gases (ammonia, phosphine, hydrogen and methane). These gases could present a health hazard in confined or poorly ventilated spaces. If molten: Use dry sand to contain the flow of material. All tooling (e.g., shovels or hand tools) and containers which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. Allow the spill to cool before remelting as scrap.

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KAISER ALUMINUM WARRICK