

AMG Aluminum North America, LLC

MATERIAL SAFETY DATA SHEET

AMG Aluminum North America, LLC
 Suite 300
 435 Devon Park Drive
 Wayne, PA 19087

POTASSIUM ALUMINUM FLUORIDE

MSDS IDENTIFICATION NUMBER A400	DATE ISSUED 12/16/1986	ISSUED BY: AMG Aluminum North America, LLC	EMERGENCY PHONE NUMBERS: AMG Aluminum North America, LLC 800-523-8457
	DATE REVISED 1/1/2013		CHEMTREC: 1-800-424-9300

I. Product Identification

CHEMICAL NAME: Potassium Aluminum Fluoride	CHEMICAL FAMILY: Inorganic Fluoride Salts
TRADE NAME: PAF - Potassium Cryolite	FORMULA: KAIF4 & K3AlF6

II. Hazardous Constituents

CONSTITUENT(S)	PERCENT	CAS NUMBER	NIOSH RTECS NUMBER	EXPOSURE LIMITS (as mg/m3)	
				OSHA TWA	ACGIH TLV
Potassium Aluminum Fluoride	100	60304-36-1	None	Fluoride: 2.5; Al: Dust=15; Respirable Fraction=5	Fluoride: 2.5; Al: Dust 10.0; Fumes 5.0

* Many substances do not have a unique exposure limit. The absence of an exposure limit does not lessen consideration for exposure risk. In the absence of specific information, professional judgment may be required.

III. SARA TITLE III Reporting Requirements

ELEMENT	Potassium Aluminum Fluoride					
SUBJECT TO SECTION 313 REPORTING	NO					

IV. Physical Properties

FREEZING POINT: Not Applicable	VAPOR PRESSURE (mmHg): Not Applicable
MELTING POINT: 580°C	VAPOR DENSITY (AIR=1): Not Applicable
BOILING POINT: Decomposes	DENSITY (H ₂ O = 1): 2.66
SUBLIMES @: Not Applicable	SOLUBILITY IN WATER: Slight
EVAPORATION RATE: Not Applicable	% VOLATILES BY VOLUME: Not Applicable
APPEARANCE AND ODOR: Powder or Lumps - White Crystalline Color - No Odor	

V. Fire, Explosion, and Reactivity Information	
FLASH POINT (WITH TEST METHOD) None	FLAMMABLE (EXPLOSIVE) LIMITS V/ V% LEL: None UEL: None
EXTINGUISHING MEDIA	This alloy is noncombustible. Use extinguishing media appropriate to the surrounding fire.
SPECIAL FIRE FIGHTING PROCEDURES	If this material is involved in a fire-fighting task, use a full-face, air-supplied, positive pressure respiratory device to protect against exposure to hydrogen fluoride and fumes of fluoride salts.
UNUSUAL FIRE AND EXPLOSION HAZARDS	No unusual fire or explosion hazards are associated with this material.
GENERAL REACTIVITY	This product is a stable material.
INCOMPATIBILITY (MATERIALS TO AVOID)	Contact with acids liberates hydrogen fluoride gas that is toxic and corrosive.
HAZARDOUS DECOMPOSITION PRODUCTS	During melting operations and at elevated temperatures, various fluoride compounds will be liberated including, but not limited to, hydrogen fluoride and potassium fluoride.
VI. Health Hazard Information	
PRIMARY ROUTE(S) OF EXPOSURE	<p>INHALATION: Inhalation of fluoride salts may result during blending, mixing, melting, pouring, crushing or grinding operations which generate airborne particulate during use of this material.</p> <p>INGESTION: Hand, clothing and drink contact with fluoride salts, dust, or fume can cause ingestion of particulate during hand to mouth activities such as eating, drinking, smoking, nail biting, etc.</p> <p>SKIN: Skin contact with fluoride salts can cause irritation, redness, swelling of tissue, and permanent scarring or disability.</p> <p>EYE: Particulate fluoride salt dust or fume can cause severe burning and swelling to the eye and surrounding tissue. Airborne particulate is always a problem as well as inserting fingers into the eye socket if the hand or clothing is contaminated with fluoride salts.</p>
TOXICITY	Exposure to the dust or fume of fluoride salts may present significant health hazards. Fluoride salts can cause acute poisoning or death (principally by ingestion). Skin contact and exposure to mucous membranes can cause severe irritation and tissue damage. Nose bleeds and slow healing scars in the nasal passage have been reported. Crippling bone changes and mottling of tooth enamel are chronic effects of exposure although they are not common among current industrial employees.
EFFECTS OF OVEREXPOSURE	<p>ACUTE: Ingestion of fluoride salts can cause severe gastric pain, internal bleeding, tissue damage, and death. Acute poisoning from inhalation is not common. Nose bleeds, skin irritation, eye irritation, tissue damage and slow healing scars can result if exposure is excessive. Fluoride salts are soluble in body fluids and sweat and are corrosive to the skin and mucous membranes.</p> <p>CHRONIC: Chronic exposure to fluoride compounds has been reported to cause a calcification of bone and ligaments known as osteosclerosis (hardening of the bone due to deposition of fluoride) and mottling of tooth enamel although neither effect is common in industrial populations. Prolonged exposure to fluoride salts may cause damage to the skin, eye and mucous membranes.</p>

VI. Health Hazard Information (continued)			
CARCINOGENIC REFERENCES	Neither product nor its ingredients are listed as a carcinogen by the National Toxicology Program, International Agency for Research on Cancer, or United States Occupational Safety and Health Administration.		
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE	Persons with pre-existing eye and skin disorders or damage to mucous membranes may be more susceptible to the effects of fluoride exposure. Because fluoride dust and fume can be a respiratory irritant and has been linked to skeletal abnormalities and gastric complications, proper screening or examinations should be conducted on individuals who may be exposed to further risk if handling and use of this material causes excessive exposure.		
VII. Emergency First Aid and Procedures			
INHALATION	Breathing difficulty caused by inhalation of fluoride compounds requires removal to fresh air. If breathing has stopped, perform artificial respiration and obtain medical assistance at once. If over-exposure to metal fume produces chills, muscle aches or fever, move the exposed person to fresh air and obtain medical assistance at once.		
INGESTION	Swallowing fluoride compounds requires medical assistance at once. Do NOT induce vomiting for any amount. Dilution of ingested fluoride must be done with caution. Control of shock, inflammation of tissue, progressive tissue destruction and electrolyte imbalance require close observation for at least 48 hours.		
SKIN	Skin cuts and abrasions and contamination must be flushed immediately under a drenching rinse of cool water. Mild skin effects can be treated by using calcium gluconate applied topically. More severe burns may require injection with calcium gluconate. Skilled medical treatment is necessary to control pain and tissue destruction.		
EYES	Fluoride containing compounds should be flushed from the eyes with copious amounts of clean water. Pain can be relieved with 2 or 3 drops of .5% pontocaine ophthalmic solution. Medical assistance should be obtained at once. Contact lenses should not be worn if working with fluoride salts or compounds.		
VIII. Industrial Hygiene Control Measures			
VENTILATION	Local exhaust ventilation should be used to control exposure to airborne dust and fume whenever possible.		
RESPIRATORY PROTECTION	Use NIOSH approved respirators as specified by an Industrial Hygienist or qualified Safety Professional. Lung function tests are recommended for users of negative pressure devices.		
PROTECTIVE GLOVES	Wear gloves to prevent hand contact with fluoride compounds. Gauntlet-type-gloves are recommended and, where fluoride containing solutions or acids are used, the gloves should be acid resistant.		
EYE PROTECTION	Wear safety glasses, chemical goggles (plastic lens) or full-face shield when handling fluoride compounds. Do not wear contact lenses.		
OTHER PROTECTIVE EQUIPMENT	Protective clothing such as uniforms, disposable coveralls, safety shoes, etc., may be required during handling operations as appropriate to the circumstances of exposure. For increased protection it may be advisable to wear acid resistant jacket, boots, trousers, etc., as appropriate.		
RECOMMENDED MONITORING PROCEDURES	<table border="0"> <tr> <td>ENVIRONMENTAL SURVEILLANCE: Exposure to the elements identified in Section II can be best determined by having air samples taken in the employee breathing zone, work area or department. Sample analysis should be for total fluoride content plus any other constituent of concern.</td> <td>MEDICAL SURVEILLANCE: Lung function tests, chest x-rays and routine physical examinations may be useful to determine effects of dust or fume exposure. Urinary fluoride analysis can be a useful indicator of exposure, but requires baseline testing and post-exposure sample.</td> </tr> </table>	ENVIRONMENTAL SURVEILLANCE: Exposure to the elements identified in Section II can be best determined by having air samples taken in the employee breathing zone, work area or department. Sample analysis should be for total fluoride content plus any other constituent of concern.	MEDICAL SURVEILLANCE: Lung function tests, chest x-rays and routine physical examinations may be useful to determine effects of dust or fume exposure. Urinary fluoride analysis can be a useful indicator of exposure, but requires baseline testing and post-exposure sample.
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IX. Environmental Protection Information

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	If this material is in powder or dust form, clean-up should be conducted with a vacuum system utilizing a high efficiency particulate air filtration system. Caution should be taken to minimize airborne generation of powder or dust and avoid contamination of air and water. Spills of fluoride containing solutions or acids should be neutralized by careful additions of a lime slurry, soda ash or other alkali. Small amounts may be treated by using excess water to reduce acidity. Caution must be taken during neutralization to avoid exposure to hydrogen fluoride gas or other fluoride compounds generated.
WASTE DISPOSAL METHOD	State or federal regulations may require specific labeling, packing, storage, transportation and disposal procedures. Contact an Environmental Engineer or consultant familiar with waste disposal regulations.
ENVIRONMENTAL HAZARDS	Fluoride compounds may have significant impact on air and water quality. Airborne emissions, spills and releases to the environment (discharge to streams, sewer systems, ground water, surface soil, etc.) should be controlled immediately. If such potential for a spill or release exists it is advisable to develop an emergency spill response plan. It is also advisable to consider monitoring ambient air as well as any effluent which may contain fluorides if potential exists for damage to aquatic or terrestrial ecosystems.

X. Special Precautions

HANDLING PRECAUTIONS	This product must be handled accordingly to the size, shape and quantity of material involved. Drums may require use of hoists, cranes, etc. Powder or liquid handling should be conducted to minimize employee contact and spill or release potential. Wash hands prior to eating or smoking.
STORAGE PRECAUTIONS	Store this product in a dry area. Fluoride salts should not be stored adjacent to acids. Keep away from contact with food or feed products.

Additional Information

The following is the label text which accompanies this product during shipment:

POTASSIUM ALUMINUM FLUORIDE (POTASSIUM CRYOLITE)

DANGER! INHALATION OF DUST OR FUME MAY CAUSE SERIOUS LUNG INJURY. SKIN, EYE, AND MUCOUS MEMBRANE IRRITATION MAY OCCUR. MAY BE FATAL IF SWALLOWED.

- This product contains inorganic Fluoride salts.
- Inhalation of dust or fume may cause severe irritation to the lung, nose and throat. Skin, eye and mucous membrane irritation may be caused from contact with dust or fume. Fluoride salts can cause corrosive effects on tissue and nose-bleeds with painful, slow-healing scars.
- Avoid breathing dust or fume. If the use of this material produces dust or fume, use appropriate ventilation controls and/or personal protective equipment. For additional information refer to the Matenal Safety Data Sheet (MSDS) for this product.
- Inhalation of Fluoride Salts (dust or fume), ingestion, or skin contact requires immediate attention and may require medical assistance. Contact with the salt requires copious washing with clean water. Excessive inhalation requires immediate removal to fresh air, administration of oxygen, and medical assistance.

CONTENT AND DESCRIPTIONS OF AMG Aluminum North America, LLC. MATERIAL SAFETY DATA SHEETS

These definitions are intended for use with Material Safety Data Sheets supplied by AMG Aluminum North America, LLC. Questions concerning these sheets should be directed to:

AMG Aluminum North America, LLC
Suite 300
435 Devon Park Drive
Wayne, PA 19087

SECTION I - PRODUCT IDENTIFICATION

Chemical Name: A name consistent with the nomenclature system of the International Union of Pure & Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS).

Trade Name: The name the product is sold by, i.e., the product name.

Chemical Name: A general designation for a group of elements or compounds.

Formula: The scientific designation for an element or compound.

SECTION II - HAZARDOUS CONSTITUENTS

Constituent(s): The chemical component(s) of the product. A hazardous constituent is a chemical which is a physical hazard or health hazard.

Percent: The amount of component or range present in the product and expressed on a weight basis.

CAS Number: A specific chemical identification number assigned by the Chemical Abstracts Service. The lack of a CAS Number for any given chemical or mixture indicates that a number may not have been assigned.

NIOSH RTECS Number: The National Institute for Occupational Safety & Health (NIOSH) Registry of Toxic Effects of Chemical Substances (RTECS) Access Number for a specific element or compound's toxicological data.

OSHA PEL: The Occupational Safety & Health Administration (OSHA) Permissible Exposure Limit (PEL) - usually a time weighted average (TWA) ceiling limit (C) or maximum peak exposure limit (P) expressed as PPM (parts per million) or as Mg/M3 (milligrams per cubic meter).

ACGIH TLV: The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) - In many cases, identical to the OSHA PEL. ACGIH also recommends a short term exposure limit (STEL) for certain substances that should not be exceeded at any time.

SECTION III - SARA TITLE III

Section 313 of Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 requires reporting of information relating to the release of certain chemicals. The chemicals contained in corporation products may be subject to reporting and are identified in this section. Refer to 40 CFR Part 372 - **Toxic Chemical Release Reporting; Community Right to Know** to determine if your facility is subject to these reporting requirements. This information may not be deleted from the Material Safety Data Sheet, and must be copied and redistributed whenever this material is redistributed. This requirement is imposed by Federal regulation.

SECTION IV - PHYSICAL PROPERTIES

Freezing Point: The temperature at which a liquid changes to a solid. A range may be given.

Melting Point: The temperature at which a solid changes to a liquid. A range may be given.

Boiling Point: The temperature at which a liquid changes to a vapor. Usually expressed at sea level pressure (760mm-Hg).

Sublimes @: The temperature at which a solid changes directly to vapor.

Evaporation Rate: Indicated as faster or slower than Ethyl Ether unless stated.

Appearance and Odor: A description of the product in terms of form, color, odor, etc.

Vapor Pressure (mmHg): The pressure of a saturated vapor above a liquid expressed as mmHg at 20°C, unless stated at a different temperature.

Vapor Density (air=1): The relative density of a vapor or gas compared to an equal volume of air. Air is equivalent to 1.0.

Specific Gravity (H₂O=1): The ratio of the weight of a volume of material to the weight of an equal volume of water. Water is equivalent to 1.0 @ 4°C. The term "DENSITY" describes the concentration of matter as the mass per unit volume, e.g., pounds/cubic inch.

Solubility In Water: The degree to which a material is capable of dissolving in water.

% Volatiles By Volume: The volumetric percentage of volatile compounds in a product.

SECTION V - FIRE, EXPLOSION, AND REACTIVITY INFORMATION

Flash Point (With Test Method): The lowest temperature at which a vapor/air mixture will propagate a flame above the surface of the material being tested.

Flammable (Explosive) Limits V/V%:

LEL; LOWER EXPLOSION LIMIT: The lowest vapor concentration in air at which ignition by spark or flame will occur.

UEL: UPPER EXPLOSION LIMIT: The highest vapor concentration in air at which ignition by spark or flame will occur.

Extinguishing Media: The type of fire extinguishing media to be used taking into account the type of chemical and its flammable characteristics.

Special Fire Fighting Procedures: Indicates equipment to protect firemen from toxic products of combustion.

Unusual Fire and Explosion Hazards: Chemical changes that may occur under heat or fire conditions.

General Reactivity: The tendency of a material to undergo chemical reaction with the release of energy.

Incompatibility (Materials To Avoid): Materials which could cause dangerous reactions.

Hazardous Decomposition Products: The breakdown of a material into compounds or elements that may have specific hazard properties different than the original material.

SECTION VI - HEALTH HAZARD INFORMATION

Primary Routes of Exposure:

Inhalation: The breathing in of a gas/fume, vapor, or mist as a contribution to exposure.

Ingestion: The swallowing of a substance as a contribution to exposure.

Skin: The contribution to exposure by the cutaneous route, either skin absorption or skin contact.

Eyes: The effect of chemical exposure on the eye.

Toxicity: The available toxicological data usually expressed as lethal dose or lethal concentration of the material or its components. Most toxicity test results are from exposure tests conducted on animals such as rats or mice, and caution is recommended in making direct comparison to human beings.

Effect of Overexposure:

Acute: Rapid effects of exposure with severe symptoms.

Chronic: Effects due to exposure that develop slowly over a long period of time or which recur frequently.

Carcinogenic References: Available references which indicate the potential for a material to cause cancer in man or animals.

Medical Conditions Aggravated By Exposure: Medical conditions that warrant consideration regarding exposure to a toxic substance.

SECTION VII - EMERGENCY & FIRST AID PROCEDURES

Inhalation: Emergency action to address adverse effects due to inhalation of a hazardous material.

Ingestion: Emergency action to address adverse effects due to ingestion of a hazardous material.

Skin: Emergency action to address adverse effects due to skin contact or absorption of a hazardous material.

Eyes: Emergency action to address adverse effects or injury to the eye due to contact with a hazardous material.

SECTION VIII - INDUSTRIAL HYGIENE CONTROL MEASURES

Ventilation: Recommended type of ventilation for control of gases or particulate.

Respiratory Protection: General information on the type of respiratory protection recommended.

Protective Gloves: Recommendation for protection to prevent hand contact with the material.

Eye Protection: Recommendation to protect against eye injury.

Other Protective Equipment: Other personal protective equipment (PPE) such as clothing, safety shoes, etc. that may be appropriate to protect against injury or exposure.

Recommended Monitoring Procedures:

Environmental Surveillance: Personal air sampling or related procedures to evaluate exposure of an individual.

Medical Surveillance: Biological monitoring or related tests/examinations to evaluate the effects of exposure to an individual.

SECTION IX - ENVIRONMENTAL PROTECTION INFORMATION

Steps To Be Taken If Material Is Released Or Spilled: Specifically refers to containment, cleanup and control.

Waste Disposal Method: Refers to recommended disposal practices or applicable regulatory requirements when known.

Environmental Hazards: Refers to information such as aquatic or vegetative toxicity, ambient air pollution concerns, etc. which are available from regulatory or published technical services.

SECTION X - SPECIAL PRECAUTIONS

Handling Precautions: Safe movement of the product may require specific handling procedures.

Storage Precautions: Safe storage of the product may require specific storage procedures.

ADDITIONAL INFORMATION

The Information in this document is believed to be correct as of the data issued. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PURPOSE OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THIS INFORMATION, THE RESULTS TO BE OBTAINED FROM USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. This information and the product are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use thereof.