MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material Name	**SYNTHETIC CRYOLITE**
MSDS Number	189
Chemical Formula	Mixture
Product use	Aluminum reduction cells
Synonym(s)	Cryolite * Chiolite * Sodium aluminum fluoride * Trisodium hexafluoroaluminate
Manufacturer information	Alcoa Inc. 201 Isabella Street Pittsburgh, PA 15212-5858 US Health and Safety: +1-412-553-4649
Emergency Information	USA: Chemtrec: +1-703-527-3887 +1-800-424-9300 ALCOA: +1-412-553-4001
Website	For a current MSDS, refer to Alcoa websites: www.alcoa.com or Internally at my.alcoa.com EHS Community

2. Hazards Identification

Emergency overview Solid. Granular to powder. Light brown. Odorless. Non-combustible. Not an explosion hazard. Direct contact: Can cause irritation of the eyes and skin. Dust: Can cause irritation of the upper respiratory tract. Decomposition can generate toxic and irritating gases.

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.

Eyes	Direct contact: Can cause irritation.
Skin	Direct contact: Can cause irritation.
Inhalation	Dust: Can cause irritation of the upper respiratory tract. Chronic overexposures: Can cause fluoride deposition in bones and cartilage. Additional health effects from elevated temperature processing (e.g., melting, Aluminum reduction cells): Vapors: Can cause severe irritation of the respiratory tract. Acute overexposures: Can cause cough and the accumulation of fluid in the lungs (pulmonary edema). Effects can be delayed up to 24 hours.
Ingestion	Can cause irritation. May be harmful if swallowed.
Carcinogenicity and Reproductive Hazard	Does not present any cancer or reproductive hazards.
Medical conditions aggravated by exposure to product	Asthma, chronic lung disease, and skin rashes.

3. Composition / Information on Ingredients

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

Components	CAS #	Percent
Cryolite (Trisodium hexafluoroaluminate)	13775-53-6	88 - 95
Aluminum oxide (non-fibrous)	1344-28-1	3 - 6

Additional Information Loss on ignition 2-6%

4. First Aid Measures

First aid procedures

Eye contact	Rinse eyes with plenty of water or saline for at least 15 minutes. Consult a physician.
Skin contact	Wash with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Inhalation Remove to fresh air. Check for clear airway, breathing, and presence of pulse. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.

Ingestion If swallowed, dilute by drinking large amounts of water. Recommend quantities up to 30 mL (~1 oz.) in children and 250 mL (~9 oz.) in adults. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do NOT induce vomiting. Call a physician immediately.

5. Fire Fighting Measures

Flammable/Combustible Properties Non-combustible. Hydrogen fluoride gas can be evolved above 930°F (500°C) in the presence of water vapor.

Extinguishing media

Suitable extinguishing media Use fire fighting methods and materials that are appropriate for surrounding fire.

Protection of firefighters

Protective equipment for firefighters Fire fighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

6. Accidental Release Measures

Environmental precautions Do not allow this material to drain into sewers/water supplies.

Spill or leak procedure Avoid generating dust. Avoid contact with skin and eyes. Use dry cleanup procedures.

7. Handling and Storage

Handling Avoid generating dust. Avoid contact with skin and eyes.

Storage Keep material dry. Store away from strong acids.

8. Exposure Controls / Personal Protection

Engineering controls Dust: Use with adequate ventilation to meet the limits listed in Section 8.

Occupational exposure limits

ACGIH

Components	Type	Value	Form
Aluminum oxide (non-fibrous) (1344-28-1)	TWA	1 mg/m3	
Cryolite (Trisodium hexafluoroaluminate) (13775-53-6)	TWA	2.5 mg/m3	(as F)
Compounds Formed During Processing	**Type**	**Value**	**Form**
Hydrogen fluoride (7664-39-3)	Ceiling	2 ppm	(as F)
	TWA	0.5 ppm	(as F)

U.S. - OSHA

Components	Type	Value	Form
Aluminum oxide (non-fibrous) (1344-28-1)	TWA	5 mg/m3	(respirable fraction)
	TWA (total dust)	15 mg/m3	(total dust)
Cryolite (Trisodium hexafluoroaluminate) (13775-53-6)	TWA	2.5 mg/m3	(as F)
Compounds Formed During Processing	**Type**	**Value**	**Form**
Hydrogen fluoride (7664-39-3)	TWA	3 ppm	

Alcoa

Components	Type	Value	Form
Aluminum oxide (non-fibrous) (1344-28-1)	TWA	5 mg/m3	(respirable fraction)
	TWA (inhalable)	10 mg/m3	(inhalable)
Cryolite (Trisodium hexafluoroaluminate) (13775-53-6)	TWA	0.5 mg/m3	(8 Hour)
Compounds Formed During Processing	**Type**	**Value**	**Form**
Hydrogen fluoride (7664-39-3)	STEL	4.9 mg/m3	(8 Hour)
	TWA	0.5 mg/m3	(8 Hour)

Personal protective equipment

Eye / face protection Wear safety glasses with side shields.

Skin protection Wear impervious gloves to avoid direct skin contact.

Respiratory protection 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, Acid gas cartridge for Hydrogen fluoride gas.

9. Physical & Chemical Properties

Form	Granular to powder.
Color	Light brown.
Boiling point	Not applicable
Melting point	1832 °F (1000 °C)
Flash point	Not applicable
Auto-ignition temperature	Not applicable
Flammability limits in air, lower, % by volume	Not applicable
Flammability limits in air, upper, % by volume	Not applicable
Vapor pressure	Not applicable
Vapor density	Not applicable
Solubility (water)	Slightly soluble
Specific gravity	2.9
Density	1.09 - 1.12 g/cm3 (68.049 - 69.922 lb/ft3)
pH	Not applicable
Odor	Odorless.
Partition coefficient (n-octanol/water)	Not applicable

10. Chemical Stability & Reactivity Information

Chemical stability	Stable under normal conditions of use, storage, and transportation.
Incompatible materials	Contact with strong acids releases hydrogen fluoride.
Hazardous decomposition products	Hydrogen fluoride gas can be evolved above 930°F (500°C) in the presence of water vapor.
Hazardous polymerization	Will not occur.

11. Toxicological Information

Health effects associated with ingredients

Cryolite: Can cause irritation of eyes, mucous membranes, skin and 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.

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

Health effects associated with compounds formed during processing

Hydrogen fluoride gas can be evolved above 930°F (500°C) in the presence of water vapor.
Hydrogen fluoride: Can cause severe irritation of the eyes, mucous membranes, skin and respiratory tract. Acute overexposures: Can cause cough, shock, the accumulation of fluid in the lungs (pulmonary edema) and death. Effects can be delayed up to 24 hours.

Component analysis - LD50 No data available for this product.

Components

Toxicology Data - Selected LD50s and LC50s

Aluminum oxide (non-fibrous) (1344-28-1)	Oral LD50 Rat: >5000 mg/kg
Cryolite (Trisodium hexafluoroaluminate) (13775-53-6)	Oral LD50 Rat: >5 g/kg

Compounds Formed During Processing

Toxicology Data - Selected LD50s and LC50s

Hydrogen fluoride (7664-39-3)	Inhalation LC50 Rat: 850 mg/m3/1H; Inhalation LC50 Rat:1276 ppm/1H

Carcinogenicity No information available for product.

Components

ACGIH - Threshold Limit Values - Carcinogens

Cryolite (Trisodium hexafluoroaluminate) (13775-53-6) A4 - Not Classifiable as a Human Carcinogen

12. Ecological Information

Ecotoxicity

Components

Ecotoxicity - Water Flea Data

Cryolite (Trisodium hexafluoroaluminate) (13775-53-6) 48 Hr EC50 Daphnia pulex: 5 mg/L

Compounds Formed During Processing

Ecotoxicity - Freshwater Fish Species Data

Hydrogen fluoride (7664-39-3) 48 Hr LC50 Lepomis macrochirus: 660 mg/L

Ecotoxicity - Water Flea Data

Hydrogen fluoride (7664-39-3) 48 Hr EC50 Daphnia magna: 270 mg/L

Environmental Fate No data available for product.

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.

Waste codes RCRA Status: Not federally regulated in the U.S. if disposed of "as is."
RCRA waste codes other than described here may apply depending on use of the product. Status must be determined at time of disposal. Refer to 40 CFR 261 or state equivalent in the U.S.

14. Transport Information

U.S. Department of Transportation (DOT)

Basic shipping description:

UN number -
Proper shipping name Not Regulated
Hazard class -
Packing group -

DOT Specific Notes

• This material is regulated differently when transported to, from or within a country that is required to comply with the ADR. Refer to the destination country's version of the MSDS for transportation information.
• When not regulated domestically (e.g., US DOT, TDG Canada), materials shipped within or between such countries via all modes (motor, rail, water, air) are Not regulated.
• When not regulated domestically (e.g., US DOT, TDG Canada), materials shipped within or between such countries via all modes (motor, rail, water, air) are Not regulated.
• Transport in a dry and covered sift-proof packaging or receptacle. Outside storage during transit permitted on pads (with a base of concrete or other impervious material) that are covered and have secondary containment.
• Trisodium hexafluoroaluminate (Cryolite) is not listed on Table 1, Appendix A to 49 CFR 172.101, the USDOT List of Hazardous Substances and Reportable Quantities.
• If a "Release" (extremely large quantities, e.g.; >3000 ton) occurs at any time while shipment is in the U.S., in any 24 hr period, the National Response Center must be notified immediately . If material is intended for shipments of such size, please contact EHS Services for more information on RQ's.
• Material is not a Marine pollutant.
• The import/export HTS (Harmonized Tariff Schedule) code given above is the United States HTS code provided by Alcoa's Customs Compliance Office in Knoxville, TN. 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.

U.S. Department of Transportation (DOT)

Alternate Basic Shipping Description #1

Basic shipping description:

UN number UN3077
Proper shipping name Environmentally hazardous substance, solid, n.o.s.
Hazard class 9
Packing group III

Additional description & information:

Technical name	TRISODIUM HEXAFLUOROALUMINATE
HTSUS	2824.90.3900
STCC	(To be determined)

Notes for Alternate DOT Description

• Applies to shipments to, from and within countries regulated by European Agreement concerning Carriage of Dangerous Goods by Road (ADR) according to Chapter 2.2.9.1.10. This mixture has been designated as N: Dangerous to the Environment and further classified as R51/53: Toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment. IBC08, UN packaging (e.g. flexible, lined Super Sacks®) authorized.
• Material is not a Marine pollutant.

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 it manufactured using ozone-depleting chemicals.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - No
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

State regulations

Components

U.S. - California - 8 CCR Section 339 - Director's List of Hazardous Substances

Aluminum oxide (non-fibrous) (1344-28-1)	Present

U.S. - Massachusetts - Right To Know List

Aluminum oxide (non-fibrous) (1344-28-1)	Present

U.S. - Minnesota - Hazardous Substance List

Aluminum oxide (non-fibrous) (1344-28-1)	Present (dust)
Cryolite (Trisodium hexafluoroaluminate) (13775-53-6)	Present (dust)

U.S. - New Jersey - Right to Know Hazardous Substance List

Aluminum oxide (non-fibrous) (1344-28-1)	sn 2891
Cryolite (Trisodium hexafluoroaluminate) (13775-53-6)	sn 0936

U.S. - Pennsylvania - RTK (Right to Know) List

Aluminum oxide (non-fibrous) (1344-28-1)	Environmental hazard
Cryolite (Trisodium hexafluoroaluminate) (13775-53-6)	Present

Inventory status

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

16. Other Information

MSDS History
Origination date: June 28, 1981
Supersedes: February 14, 2006
Revision date: March 3, 2009

MSDS Status	March 3, 2009: New format. February 14, 2006: Change(s) in Section: 1, 3, 4, 8, 11 and 15. March 18, 2003: Reviewed on a periodic basis in accordance with Alcoa policy. Changes to Product Label. Replaces Eastalco Aluminum Company MSDS for "Bath (Synthetic Cryolite)".
Prepared By	Hazardous Materials Control Committee Preparer: Jon N. Peace, 412-553-2293/Robert W. Barr, 412-553-2618
MSDS System Number	147522

Other information

- Guide to Occupational Exposure Values 2008, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
- Documentation of the Threshold Limit Values and Biological Exposure Indices, Sixth Edition, 1991, Compiled by the American Conference of Governmental Industrial Hygienists, Inc. (ACGIH).
- NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, February 2004.
- Dangerous Properties of Industrial Materials, Sax, N. Irving, Van Nostrand Reinhold Co., Inc., 1984.
- Patty's Industrial Hygiene and Toxicology: Volume II: Toxicology, 4th ed., 1994, Patty, F. A.; edited by Clayton, G. D. and Clayton, F. E.: New York: John Wiley & Sons, Inc.
- expub, Expert Publishing, LLC.

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 MSDS ***

SYNTHETIC CRYOLITE

WARNING

Non-combustible. Not an explosion hazard.

Direct contact: Can cause irritation of the eyes and skin. Dust: Can cause irritation of the upper respiratory tract. Chronic overexposures: Can cause fluoride deposition in bones and cartilage. Decomposition can generate toxic and irritating gases.

FIRST AID

Eye contact	Rinse eyes with plenty of water or saline for at least 15 minutes. Consult a physician.
Skin contact	Wash with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Inhalation	Remove to fresh air. Check for clear airway, breathing, and presence of pulse. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.
Ingestion	If swallowed, dilute by drinking large amounts of water. Recommend quantities up to 30 mL (~1 oz.) in children and 250 mL (~9 oz.) in adults. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do NOT induce vomiting. Call a physician immediately.

FIRE FIGHTING

Suitable extinguishing media	Use fire fighting methods and materials that are appropriate for surrounding fire.

SPILL PROCEDURES

Spill or leak procedure	Avoid generating dust. Avoid contact with skin and eyes. Use dry cleanup procedures.

HANDLING AND STORAGE

Handling	Avoid generating dust. Avoid contact with skin and eyes.
Storage	Keep material dry. Store away from strong acids.

See Alcoa Material Safety Data Sheet No. 189 for more information about use and disposal.
Emergency Phone: (412) 553-4001

Contains:

Cryolite (Trisodium hexafluoroaluminate)	13775-53-6
Aluminum oxide (non-fibrous)	1344-28-1

Alcoa Inc.
201 Isabella Street, Pittsburgh PA 15212-5858 United States

3/09

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