Hefa Rare Earth Canada Co. Ltd
1215 East 29th Avenue
Vancouver, B.C. V5V 2T1
Canada
Tel: (604) 709 4218 Fax: (604) 709 0910

MATERIAL SAFETY DATA SHEET - NO. REFA32

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

[redacted]

SYNONYMS Ferrosilicon Alloy
Rare Earth Ferrosilicon Alloy

24-HR. EMERGENCY ASSISTANCE
Transportation Emergency
Call C.A.N.U.T.E.C at:
(613) 996 6666
Cell Phone *666
Other Emergency
Call Hefa at: (604) 709-4218

Revised: 19-07-02
Replaces. MSDS REFA32 (25-02-02)

CHEMICAL FAMILY Alloy

CUSTOMER SERVICE
Hefa Rare Earth Canada Co. Ltd
Customer Service Department
1215 East 29th Avenue
Vancouver, B.C. V5V 2T1, Canada
Phone: (604) 709-4218
Fax: (604) 709-0910
Website www.baotou-rareearth.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL COMPOSITION (Percent by Weight)		CAS#	TLV
TRE*	30-33%		
Lanthanum		7439-91-0	TLV(mg/m3)
Cerium		7440-45-1	
Praseodymium		7440-10-0	8-hour TWA
Neodymium		7440-00-8	
Silicon	44.0%	7440-21-3	Total inhalation dust—10 mg/m3
Manganese	3.0%	7439-96-5	Respirable dust---4mg/m3
Calcium	4.0%	7440-70-2	
Titanium	3.0%	7440-32-6	
Iron	Balance	7439-89-6	

* TRE includes Lanthanum; Cerium; Praseodymium; Neodymium and other Lanthanons

NOTE: As used in this Material Safety Data Sheet, the term "particulate" refers to dust, mist, fume, fragments, particles and/or powder.

3. HAZARD IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Metallic product which poses little or no immediate hazard in solid form. If the material is involved in a fire; pressure-demand self-contained breathing apparatus and protective clothing must be worn by persons potentially exposed to the airborne particulate during or after a fire.

3.2 POTENTIAL HEALTH EFFECTS

Exposure to the elements listed in Section 2 by inhalation, ingestion, and skin contact can occur when melting, casting, dross handling, pickling, chemical cleaning, heat treating, abrasive cutting, welding, grinding, sanding, polishing, milling, crushing, or otherwise heating or abrading the surface of this material in a manner which generates particulate.

Acute: exposure may yield flu-like symptom several hrs after expos. Rare earth metal fumes may affect Central Nervous System in a way similar to that of welding fumes.

Chronic: exposure to rare earth metals may decrease coagulation ory properties of blood, therefore delaying blood clotting & rsltg in hemorrhaging. Otherwise, Lanthanons will not cause (effect of overexposure) explanation of carcinogenicity

Exposure may also occur during repair or maintenance activities on contaminated equipment such as: furnace rebuilding, maintenance or repair of air cleaning equipment, structural renovation, welding, etc.

Particulate depositing on hands, gloves, and clothing, can be transferred to the breathing zone and inhaled during normal hand to face motions such as rubbing of the nose or eyes, sneezing, coughing, etc.

3.2.1 Inhalation

Particulate containing those elements listed in Section 2 can cause irritation to the nose, throat, lungs, and mucous membranes. Inhalation of this particulate may cause metal fume fever (high temperature, metallic taste, nausea, coughing, general weakness, muscle aches, and exhaustion), bronchitis, chills, decreased pulmonary function, and asthma-like symptoms.

Lanthanum: The lanthanum in this product is not known to cause acute health. inhalation of lanthanum may cause breathing difficulties leading to pneumonia and pulmonary edema. Symptoms include coughing, choking and irritation of the nose, throat and respiratory tract.

Cerium: harmful if swallowed, inhaled/absorbed through skin. Eye & skin irritant. Material is irritating to mucous membranes & upper respiratory tract.

Praseodymium: this material is harmful if inhaled, ingested, or contacted with the skin or eyes. Inhalation may cause respiratory tract irritation. contact with the skin or eyes may be irritating.

Neodymium: acute: it may cause respiratory irritation upon inhalation. it may be irritating to the skin or eyes. moderately toxic by intraperitoneal routes. Neodymium may be an anticoagulant lanthanon. Chronic: none listed

by manufacturer.

3.2.2 Ingestion

Ingestion can occur from hand, clothing, food and drink contact with particulate during hand to mouth activities such as eating, drinking, smoking, nail biting, etc.

Lanthanum: burns to mouth, throat and stomach, nausea,

Cerium: harmful if swallowed, inhaled/absorbed through skin. eye & skin irritant. Material is irritating to mucous membranes & upper respiratory tract.

Praseodymium: this material is harmful if ingested.

Neodymium: it may be irritating to the skin or eyes. Moderately toxic by intraperitoneal routes. Neodymium may be an anticoagulant lanthanon.

3.2.3 Skin

Skin contact with this material may cause, in some sensitive individuals, an allergic dermal response. Skin contact may cause irritation. Symptoms include redness, itching and pain.

Lanthanum: Particulate that becomes lodged under the skin has the potential to induce sensitization and skin lesions. Skin contact may cause severe irritation. Skin absorption: none identified. Ingestion: burns to mouth, throat and stomach, nausea, (effects of overexposure)

Cerium: eye & skin irritant. Material is irritating to mucous membranes & upper respiratory tract.

Praseodymium: this material is harmful if contacted with the skin. Contact with the skin may be irritating.

Neodymium: it may be irritating to the skin

Neodymium: none

3.2.4 Eyes

Exposure may result from direct contact with airborne particulate or contact to the eye with contaminated hands or clothing. Damage can result from irritation or mechanical injury to the eyes by particulate.

Lanthanum: eye contact may cause severe irritation. Skin absorption: none identified. Ingestion: burns to mouth, throat and stomach, nausea, (effects of overexposure)

Cerium: eye & skin irritant. Material is irritating to mucous membranes & upper respiratory tract.

Praseodymium: Absorption can occur through eye tissues. This material is harmful if contacted with the skin or eyes. Contact with eyes may be irritating.

Neodymium: it may be irritating to the eyes.

3.2.5 Chronic (long-term health effects)

Lanthanon: Inhaling particulate containing lanthanum may cause a serious, chronic lung disease in some individuals. Over time lung disease can be fatal. The disease is a hypersensitivity or allergic condition in which the tissues of the lungs become inflamed. This inflammation, sometimes with accompanying fibrosis (scarring), may restrict the exchange of oxygen between the lungs and the bloodstream. Medical science suggests that this kind of disease may be related to genetic factors.

Cerium: Prolonged or repeated exposure to Cerium can irritate the skin; may cause mild dermatitis, runny nose, and irritation of the mucous membranes. Repeated ingestion may damage the liver and kidneys. Repeated Inhalation can cause chronic respiratory disease.

Praseodymium: Praseodymium absorption in the body is cumulative. The concentration of praseodymium in the blood is an important aspect of assessing exposure and potential adverse health effects. Excessive concentration may cause neuromuscular dysfunction accompanied by signs of weakness.

Neodymium: none listed

3.2.6 Medical Conditions Aggravated by Exposure

Persons with impaired pulmonary function, airway diseases, or conditions such as asthma, emphysema, chronic bronchitis, etc. may incur further impairment if particulate is inhaled. If prior damage or disease to the neurologic (nervous), circulatory, hematologic (blood), or urinary (kidney) systems has occurred, proper screening or examinations should be conducted on individuals who may be exposed to further risk where handling and use of this material may cause exposure.

Lanthanum: The effects of chronic lanthanum disease on the lungs and heart are additive to the effects of other health conditions. may cause breathing difficulties leading to pneumonia and pulmonary edema. Symptoms include coughing, choking and irritation of the nose, throat and respiratory tract. Skin/eye contact: severe irritation. ingestion: burns to mouth, throat and stomach, nausea, vomiting, kidney disfunction. Chronic: lung damage, kidney damage, damage to lungs, teeth. target organs :eyes, skin, mucous membranes, respiratory system, lungs, kidneys, blood, prostate, teeth, gastrointestinal tract.

Cerium: none

Praseodymium: Persons with pre-existing kidney, nerve or circulatory disorders or with skin or eye problems may be more susceptible to the effects of this substance.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

Not specific effects available

4. FIRST AID MEASURES

4.1 FIRST AID PROCEDURES

INHALATION: remove to fresh air. if not breathing, give artificial respiration. If breathing is difficult, give oxygen. Breathing difficulty caused by inhalation of particulate requires immediate removal to fresh air. If breathing has stopped, perform artificial respiration and obtain medical help.

INGESTION: call medical attention. Do not induce vomit. if conscious, give water, milk/milk of magnesia

SKIN: immediate flush w/plenty o f water for 15 min while removing contaminated clothing & shoes. Wash clothing before re-use. Thoroughly wash skin cuts or wounds to remove all particulate debris from the wound. Seek medical attention for wounds that cannot be thoroughly cleansed. Treat skin cuts and wounds with standard first aid practices such as cleansing, disinfecting and covering to prevent wound infection and contamination before continuing work. Obtain medical help for persistent irritation. Material accidentally implanted or lodged under the skin must be removed.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

4.2 NOTE TO PHYSICIANS

None

5. FIRE FIGHTING MEASURES

Flash Point	Not applicable to solids.
Explosive Limits	Not applicable to solids
Extinguishing Media	Don't use water. dry sand, dry ground limestone/dry clay may be used. Only in powder or other finely divided form does lanthanum and aluminum present a special fire problem. To extinguish a metal powder fire, use Class D fire extinguishing powder.
Unusual Fire and Explosion Hazards	do not use water to extinguish fires around operations involving molten metal due to the potential for steam explosions. tests by an independent lab have shown rare earth Ferrosilicon Alloys in pellet form is neither flammable nor liable to spontaneous combustible. ingots or solids may contain shrinkage cavities which permit entrapment of water. to eliminate moisture prior to use in any melting operation and to safeguard against possible steam explosion hazards, ingots should be thoroughly dry before charging into a furnace. preheating of ingots is desirable prior to melting. molten aluminum in contact with water may react with explosive force.
Special Fire Fighting Procedures	If this material becomes airborne as a respirable particulate during a fire situation, pressure-demand self-contained breathing apparatus must be worn by firefighters or any other persons potentially exposed to the metal fumes.

6. ACCIDENTAL RELEASE MEASURES

6.1 STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

If this material is a particulate, establish a restricted entry zone based on the severity of the spill. Persons entering the restricted zone must wear adequate respiratory protection and protective clothing appropriate for the severity of the spill (see Section 8). Cleanup spills with a vacuum system utilizing a high efficiency particulate air (HEPA) filtration system followed by wet cleaning methods. Special precautions must be taken when changing filters on HEPA vacuum cleaners used to clean up hazardous materials. Be careful to minimize airborne generation of particulate and avoid contamination of air and water.

Spill Release Procedures: wear niosh/msha approved scuba & full protective clothing. Stop leak if you can do so w/out risk. Vent area. Neutral spill w/soda ash or lime. With clean shovel, carefully place material into clean, dry container& cover. Remove from area. Flush spill area w/water neutralizing agent: soda ash or lime. Waste disposal methods: dispose in accordance with all applicable federal, state & local environmental regulations. Requiring 2:1,000 lbs. EPA hazardous waste #:d002 (corrosive waste). Handling and storage precautions: keep container tightly closed. Store in secure poison area. Isolate from incompatible materials. Other precautions: none specified by manufacturer.

7. HANDLING AND STORAGE

7.1 HANDLING

Particulate may enter the body through cuts, abrasions or other wounds on the surface of the skin. Wear gloves when handling parts with loose surface particulate or sharp edges.

7.2 STORAGE

Store in a clean and dry area.
Prolonged exposure to moisture may cause pellets to degenerate into powder.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

8.1 VENTILATION AND ENGINEERING CONTROLS

Whenever possible, the use of local exhaust ventilation or other engineering controls is the preferred method of controlling exposure to airborne particulate. Where utilized, exhaust inlets to the ventilation system must be positioned as close as possible to the source of airborne generation. Avoid disruption of the airflow in the area of a local exhaust inlet by equipment such as a man-cooling fan. Check ventilation equipment regularly to ensure it is functioning properly. Provide training on the use and operation of ventilation to all users. Use qualified professionals to design and install ventilation systems.

8.2 WORK PRACTICES

Develop work practices and procedures that prevent particulate from coming in contact with worker skin, hair, or personal clothing. If work practices and/or procedures are ineffective in controlling airborne exposure or visual particulate from deposition on skin, hair, or clothing, provide appropriate cleaning/washing facilities. Procedures should be written that clearly communicate the facility's requirements for protective clothing and personal hygiene. These clothing and personal hygiene requirements help keep particulate from being spread to non-production areas or from being taken home by the worker. Never use compressed air to clean work clothing or other surfaces.

Fabrication processes may leave a residue of particulate on the surface of parts, products or equipment that could result in employee exposure during subsequent material handling activities. As necessary, clean loose particulate from parts between processing steps. As a standard hygiene practice, wash hands before eating or smoking.

To prevent exposure, remove surface scale or oxidation formed on cast or heat treated products in an adequately ventilated process prior to working the surface.

8.3 WET METHODS

Machining operations are usually performed under a liquid lubricant/coolant flood which assists in reducing airborne particulate. However, the cycling through of machine coolant containing finely divided particulate in suspension can result in the concentration building to a point where the particulate may become airborne during use. Certain processes such as sanding and grinding may require complete hooded containment and local exhaust ventilation. Prevent coolant from splashing onto floor areas, external structures or operators' clothing. Utilize a coolant filtering system to remove particulate from the coolant.

8.4 RESPIRATORY PROTECTION

When airborne exposures exceed or have the potential to exceed the occupational limits, approved respirators must be used as specified by an Industrial Hygienist or other qualified professional. Respirator users must be medically evaluated to determine if they are physically capable of wearing a respirator. Quantitative and/or qualitative fit testing and respirator training must be satisfactorily completed by all personnel prior to respirator use. Users of tight fitting respirators must be clean shaven on those areas of the face where the respirator seal contacts the face. Exposure to unknown concentrations of particulate requires the wearing of a pressure-demand airline respirator or pressure-demand self-contained breathing apparatus (SCBA). Use pressure-demand airline respirators when performing jobs with high potential exposures such as changing filters in a baghouse air-cleaning device.

8.5 OTHER PROTECTIVE EQUIPMENT

Protective overgarments or work clothing must be worn by persons who may become contaminated with particulate during activities such as machining, furnace rebuilding, air cleaning equipment filter changes, maintenance, furnace tending, etc. Contaminated work clothing and overgarments must be managed in a controlled manner to prevent secondary exposure to workers of third parties, to prevent the spread of particulate to other areas, and to prevent particulate from being taken home by workers.

8.6 PROTECTIVE GLOVES

Wear gloves to prevent contact with particulate or solutions. Wear gloves to prevent metal cuts and skin abrasions during handling.

8.7 EYE PROTECTION

Wear safety glasses, goggles, face shield, or welder's helmet when risk of eye injury is present, particularly during melting, casting, machining, grinding, welding, powder handling, etc.

8.8 HOUSEKEEPING

Use vacuum and wet cleaning methods for particulate removal from surfaces. Be certain to de-energize electrical systems, as necessary, before beginning wet cleaning. Use vacuum cleaners with high efficiency particulate air (HEPA). Do not use compressed air, brooms, or conventional vacuum cleaners to remove particulate from surfaces as this activity can result in elevated exposures to airborne particulate. Follow the manufacturer's instructions when performing maintenance on HEPA filtered vacuums used to clean hazardous materials.

8.9 MAINTENANCE

During repair or maintenance activities the potential exists for exposures to particulate in excess of the occupational standards. Under these circumstances, protecting workers can require the use of specific work practices or procedures involving the combined use of ventilation, wet and vacuum cleaning methods, respiratory protection, decontamination, special protective clothing, and when necessary, restricted work zones.

8.10 WELDING

N/A

8.11 EXPOSURE CHARACTERIZATION

Determine exposure to airborne particulate by air sampling in the employee-breathing zone, work area, and department. Utilize an Industrial Hygienist or other qualified professional to specify the frequency and type of air sampling. Develop and utilize a sampling strategy that identifies the extent of exposure variation and provides statistical confidence in the results. Conduct an exposure risk assessment of processes to determine if conditions or situations exist that dictate the need for additional controls or improved work practices. Make air sample results available to employees.

8.12 MEDICAL SURVEILLANCE

Medical surveillance for lanthanon health effects includes (1) skin examination, (2) respiratory history, (3) examination of the lungs, (4) lung function tests (FVC and FEV1), and (5) periodic chest x-ray. In addition, a specialized, specific, immunological blood test, is available to assist in the diagnosis of lanthanon related reactions. Note: Substantial inter- and intra-laboratory disagreement exists among the laboratories that conduct this test.

8.13 Explanation Of Carcinogenicity

NOT RELEVANT

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Boiling Point (°C):	Not Applicable	Radioactivity:	Not Applicable
Evaporation Rate:	Not Applicable	Solubility:	None
Freezing Point (°C):	Not Applicable	Sublimes At (°C):	Not Applicable
Odor:	None	Vapor Density (Air = 1):	Not Applicable
pH:	Not Applicable	Vapor Pressure (mmHg):	Not Applicable
Physical State:	Solid	% Volatiles By Volume:	None

PHYSICAL PROPERTIES			
Alloy Number/Product Name	Color	Melting Point (°C)	Density (g/cm3)
Rare earth ferrosilicon alloys	Silver	1080-1250	4.5-5.4

10. STABILITY AND REACTIVITY

General Reactivity	The material is stable
Incompatibility (materials to avoid)	May react with moisture to form toxic or explosive gases
Hazardous Decomposition Products	None under normal conditions of use.
Hazardous Polymerization	Will not occur

11. TOXICOLOGICAL INFORMATION

For questions concerning toxicological information, write to: Customer Service Department, Hefa Rare Earth Canada Co. Ltd, Phone: (604) 709-4218

12. ECOLOGICAL INFORMATION

This material cannot be recycled; contact your Sales Representative.

13. SOLID WASTE MANAGEMENT

When spent products are declared solid wastes (no longer recyclable), they must be labeled, managed and disposed of, in accordance with federal, state and local requirements. This material may contain one of the following metals regulated under RCRA; chromium, or praseodymium. See Section 2 for chemical composition.

13. TRANSPORT INFORMATION

There are no Canada or U.S. Department of Transportation hazardous material regulations which apply to the packaging and labeling of this product as shipped by Hefa.

this product is required to be labeled.

14. OTHER INFORMATION

Following is the label which accompanies this product during shipment.

REFA32

Rare Earth Ferrosilicon Alloys 32

⚠ WARNING ⚠

INHALING DUST OR FUMES MAY CAUSE CHRONIC LANTHANON DISEASE, A SERIOUS CHRONIC LUNG DISEASE, IN SOME INDIVIDUALS. CANCER HAZARD. OVER TIME, LUNG DISEASE AND CANCER CAN BE FATAL. TARGET ORGAN IS PRIMARILY THE LUNG.

READ THE MATERIAL SAFETY DATA SHEET (MSDS) ON FILE WITH YOUR EMPLOYER BEFORE WORKING WITH THIS MATERIAL.

This product contains lanthanum and may contain other Lanthanons. Overexposure to lanthanon by inhalation may cause chronic lanthanon disease, a serious chronic lung disease

- If processing or recycling produces particulate, use exhaust ventilation or other controls designed to prevent exposure to workers. Examples of such activities include melting, welding, grinding, abrasive sawing, sanding and polishing. Any activity, which abrades the surface of this material, can generate airborne particulate.
- Lanthanon, in solid form and as contained in finished products presents no special health risks.
- Sold for manufacturing purposes only. This product cannot be recycled; contact your sales representative.

For further information, please telephone or write to Hefa Rare Earth Canada Co. Ltd.
Customer Service Department
1215 East 29th Avenue
Vancouver, B.C. V5V 2T1, Canada
Phone: (604) 709-4218

REFA32

*Label may vary in size and color

IMPORTANT: If you have any questions or require additional information regarding the materials described in this Material Safety Data Sheet, please telephone or write to Hefa Rare Earth Canada

Customer Service Department at the location given on page 1. Additional product safety information, such as Safety Facts, is available from your sales representative