

MATERIAL SAFETY DATA SHEET

ACTIVATED ALUMINA (ALL GRADES), SOLID

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Xebec Inc.
730 Boul. Industriel
Blainville, Quebec, J7C 3V4
(450) 979-8700

WHMIS Number: 00062014
Index: HCl0872/06A
Effective Date: 2006
February 10 Date of
Revision: 2006 February 10

EMERGENCY TELEPHONE NUMBERS (FOR EMERGENCIES INVOLVING CHEMICAL SPILLS OR RELEASE)

Toronto, ON	(416) 226-6117	Montreal, QC	(514) 861-1211	Winnipeg, MB	(204) 943-8827
Edmonton, AB	(780) 424-1754	Calgary, AB	(403) 263-8660	Vancouver, BC	(604) 685-5036

PRODUCT IDENTIFICATION

Product Name: Activated Alumina (All Grades), Solid.

Chemical Name: Aluminium Oxide.

Synonyms: Aluminium Oxide Hydrated; Alumina; Aluminum Trioxide; Alumina Feedstock; Alumina Activated; Activated Alumina AA; Alumina 202 HF; Alumina AA-400; Alumina A2; Alumina A2 Dupont; Alumina A201; Alumina A203 CL; Alumina A204-4; Alumina A204-4E; Alumina A206; Alumina ABS; Alumina Bed Support; Alumina CL-750; Alumina D201; Alumina DD PG; Alumina DD2; Alumina DD 431; Alumina DD 432; Alumina DD447-165; Alumina DD450; Alumina DD 831; Alumina F200; Alumina Feedstock; Alumina PX 1; Alumina RF200; Alumina S201; Alumina S400; Alumina S431; Alumina S501; Alumina S2001; Alumina S-100 SR; Alumina Selexb CDO-200; Alumina Selexorb CD; Alumina Selexsorb CDX; Alumina Selexsorb CL-750; Alumina Selexsorb COS; Alumina Selexsorb SPCL; Alumina Spent A2 Dupont; Alumina Support Balls; Alumina T-162 Tabular; Alumina Tab. T-1061; Selexsorb CL-750; Selexsorb COS; Alumina DRM; Alumina CG-20; DD-931; CL-760; CP-5; DD-710; SRU; HF 200; A-1; A-2; A-201; A-202HF; A-206; A-300; A-302; A-305CS; 1/2" CBS; D-201; LCPP; S-200; S-201; S-2001; DrySep; A-203 (Cl); S-501, Claus Catalyst; Activated Alumina Grade A & AA; Alumina Desiccant; Catalit Alumina; Adsorbent Alumina; MMS-411-120 Aluminum Oxide: Tab T-64.

Chemical Family: Inorganic Oxide.

Molecular Formula: Al₂O₃.

Product Use: Catalyst. Drying agent. Abrasives. Chemical intermediate.

CAS #: 1344-28-1 Aluminium Oxide; 1333-84-2 Aluminium Oxide Hydrated.

WHMIS Classification / Symbol: D-2B: Toxic (Skin and Eye Irritant).



READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Activated alumina adsorbs certain gases and liquids. While the alumina itself is principally inert, the bead/powder may exhibit properties of absorbed material. (3) Dust is irritating to respiratory tract. Low hazard for usual industrial or commercial handling. See "Other Health Effects" Section. Can decompose at high temperatures forming toxic gases. Contents may develop pressure on prolonged exposure to heat.

The following health effects data pertains only to Activated Alumina. Activated alumina adsorbs certain gases and liquids. While the alumina itself is principally inert, the bead/powder may exhibit properties of absorbed material. (3)

- . Inhalation: Product may be mildly irritating to the nose, throat and respiratory tract and may cause coughing and sneezing. Excessive contact with powder may cause drying of mucous membranes of nose and throat due to absorption of moisture and oils. See "Other Health Effects" Section.
- . Skin Contact: This product may cause irritation due to abrasive action. Excessive contact with powder may cause drying of the skin due to absorption of moisture and oils. May cause defatting, drying and cracking of the skin. May cause staining.
- . Skin Absorption: Not likely to be absorbed through the skin.
- . Eye Contact: This product may cause irritation, redness and possible damage due to abrasiveness. Excessive contact with powder may cause drying of mucous membranes of the eyes due to absorption of moisture and oils.
- . Ingestion: This product may cause mild gastrointestinal discomfort. Ingestion of large amounts may cause intestinal obstruction.

Other Health Effects: Effects (irritancy) on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential.

May cause staining, metal fume fever, pulmonary fibrosis and pneumoconiosis. Metal fume fever can be caused by inhalation of fumes formed in the air from welding or heating the metal. Symptoms of metal fume fever occur about 4 to 12 hours after exposure and usually last about 24 hours. Recovery is complete with no apparent permanent disability. The symptoms resemble the "flu" and include: sweating, shivering, headache, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness and tiredness. (4)

A metallic or sweet taste in the mouth, dryness or irritation of the throat and coughing may occur at the time of exposure to the metal fumes. (4)

Some workers develop a short-term immunity so that repeated exposure to the fumes does not cause metal fume fever. This immunity is quickly lost after short absences from work (weekends or vacations). (4) Pneumoconiosis is the deposition of dust in the lungs and the tissue's reaction to its presence. When exposure to the dust is severe or prolonged, the lungs' defenses are overwhelmed.

A severe scarring of the lungs (fibrosis), referred to as Shaver's disease, has been associated with production of corundum abrasives which involved exposure to the fine airborne fumes of Aluminum Oxide and Silica. This disease worsens even after exposure has stopped and has caused death in serious cases. Exposure to Crystalline Silica or to the mixed dust is believed to be responsible. Early symptoms of the disease include cough, excessive mucous productions and shortness of breath upon exertion. Modern exposure controls have almost removed the threat of this disease. (4)

Evidence of scarring of the lungs (pulmonary fibrosis) has been reported among workers exposed to Aluminum Oxide dust or fume has, in some cases, been attributed to Aluminum Oxide exposure. However, some of the reports were individual cases, the exposure was usually mixed and other studies have failed to show similar effects. (4)

Some changes in the lung function and chest X-rays have also been observed in workers exposed to aluminum oxide. However, these changes have been attributed to chronic bronchitis related to excessive dust exposure and not specifically to Aluminum Oxide. (4)

Prolonged and repeated exposure to Aluminum may cause pulmonary fibrosis, numbness of the fingers and encephalopathy (a degenerative disease of the brain).

There may be a relationship between aluminum exposure and a brain disease which causes early senility (Alzheimer's Disease), but at present this is unproven and controversial. Asthma-like symptoms have been reported in association with refining aluminum materials and fumes from aluminum soldering. (4)

Ingestion of large amounts of Aluminum salts over a prolonged period of time may lead to phosphate deficiency, based on animal and human information. Prolonged ingestion of very

large amounts (several grams/day) may result in osteomalacia (softening and bending of the bones). (4)

3. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

Hazardous Ingredients	CAS No.	ACGIH TLV	%
Aluminium Oxide	001344-28-1	10 mg/M3 as Al *A4	85 - 100

A4 = Not classifiable as a human carcinogen. (ACGIH-A4)

5. FIRST AID MEASURES

FIRST AID PROCEDURES

The following recommendations pertains only to Activated Alumina.

- . Inhalation: Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical attention IMMEDIATELY.
- . Skin Contact: Start flushing while removing contaminated clothing. Wash affected areas thoroughly with soap and water. If irritation, redness, or a burning sensation develops and persists, repeat flushing and obtain medical attention.
- . Eye Contact: Immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY.
- . Ingestion: Do not attempt to give anything by mouth to an unconscious person. If victim is alert and not convulsing, rinse mouth out and give 1/2 to 1 glass of water to dilute material. IMMEDIATELY contact local Poison Control Centre. Vomiting should only be induced under the direction of a physician or a poison control centre. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. IMMEDIATELY transport victim to an emergency facility.

Note to Physicians: Treat symptomatically. Medical conditions that may be aggravated by exposure to this product include diseases of the skin, eyes or respiratory tract.

7. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

Flammability Class (WHMIS): Not regulated.

Flash Point (TCC, Deg. Celsius): Non-combustible (does not burn).

Autoignition Temperature (Deg. Celsius): Not applicable.

Flammability Limits in Air (%): LEL: Not applicable. UEL: Not applicable.

Hazardous Combustion Products: Thermal decomposition products are toxic and may include oxides of aluminum and irritating gases.

Unusual Fire or Explosion Hazards: Minimize air borne spreading of dust. Closed containers exposed to heat may explode.

Sensitivity to Mechanical Impact: Not expected to be sensitive to mechanical impact.

Rate of Burning: Not available. Explosive Power: Not available.

Sensitivity to Static Discharge: Not expected to be sensitive to static discharge.

EXTINGUISHING MEDIA

Fire Extinguishing Media: Use media appropriate for surrounding fire and/or materials.

FIRE FIGHTING INSTRUCTIONS

Instructions to the Fire Fighters: Spilled material may cause floors and contact surfaces to become slippery.

Fire Fighting Protective Equipment: Use self-contained breathing apparatus and protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures: Minimize air borne spreading of dust. Wear respirator, protective clothing and gloves. Avoid dry sweeping. Do not use compressed air to clean surfaces. Vacuuming or wet sweeping is preferred. Return all material possible to container for proper disposal. Do not allow to enter sewers or watercourses.

Any recovered product can be used for the usual purpose, depending on the extent and kind of contamination. Where a package (drum or bag) is damaged and / or leaking, repair it, or place it into an over-pack drum immediately so as to avoid or minimize material loss and contamination of surrounding environment. Replace damaged containers immediately to avoid loss of material and contamination of surrounding atmosphere.

Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment. See Section 13, "Disposal Considerations".

8. HANDLING AND STORAGE

HANDLING

Handling Practices: Use normal "good" industrial hygiene and housekeeping practices. Minimize air borne spreading of dust. Clean up immediately to eliminate slipping hazard.

Ventilation Requirements: See Section 8, "Engineering Controls".

Other Precautions: Use only with adequate ventilation and avoid breathing dusts. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use.

STORAGE

Storage Temperature (Deg Celsius): See below.

Ventilation Requirements: General exhaust is acceptable.

Storage Requirements: Store in a cool, dry and well-ventilated area. Keep away from heat, sparks and flames. Keep containers closed. Avoid moisture contamination. Prolonged storage may result in lumping or caking. Protect from direct sunlight. Protect against physical damage.

Special Materials to be Used for Packaging or Containers: Confirm suitability of any material before using.

10. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective

devices at your workplace.

ENGINEERING CONTROLS

Engineering Controls: General exhaust is acceptable. Local exhaust ventilation preferred. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense dust may collect.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Eye Protection: Safety glasses with side shields are recommended to prevent eye contact. Use chemical safety goggles when there is potential for eye contact. Contact lenses should not be worn when working with this material.

Skin Protection: Gloves and protective clothing made from cotton, canvas, rubber or plastic should be impervious under conditions of use. Prior to use, user should confirm impermeability. Discard contaminated gloves.

Respiratory Protection: No specific guidelines available. A NIOSH/MSHA approved dust mask for concentrations of nuisance dust up to 100 mg/M3 particulate. An air-supplied respirator if concentrations are higher or unknown.

If while wearing a respiratory protection, you can smell, taste or otherwise detect anything unusual, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator to face seal is still good. If it is, replace the filter, cartridge or canister. If the seal is no longer good, you may need a new respirator. (4)

Other Personal Protective Equipment: Wear regular work clothing. The use of coveralls is recommended. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact.

EXPOSURE GUIDELINES

Recommended Exposure Limit: None established for this product.

ACGIH TLV (STEL)	OSHA PEL (TWA)	(STEL)	NIOSH REL (TWA)	(STEL)
<hr/>				
Aluminum Oxide	15 mg/M3 as Al (Total dust)			

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

Physical State: Solid.
Appearance and Odour: Dry, white granules: fine sized, beads pucks, or powder Odourless
Odour Threshold (ppm): Not applicable.
Boiling Range (Deg Celsius): 2,980. (4)
Melting/Freezing Point (Deg Celsius): 2,050.
Vapour Pressure (mm Hg at 20 Deg. Celsius): Not applicable.
Vapour Density (Air = 1.0): Not applicable.
Relative Density (g/cc): 3.0 to 3.7.
Bulk Density: 620 to 830 Kg/M3.
Viscosity: Not applicable.
Evaporation Rate (Butyl Acetate = 1.0): Not applicable.
Solubility: Not soluble in water.
% Volatile by Volume: Not applicable.
pH: Not available.
Coefficient of Water/Oil Distribution: Not available.
Volatile Organic Compounds (VOC): Not applicable.

11. STABILITY AND REACTIVITY

Under Normal Conditions: Stable.
Under Fire Conditions: Not flammable.
Hazardous Polymerization: Will not occur.

Conditions to Avoid: High temperatures, sparks, open flames and all other sources of ignition. Minimize air borne spreading of dust. Sweep up immediately to eliminate slipping hazard.

Materials to Avoid: Strong oxidizers. Lewis or mineral acids. Chlorine trifluoride. Ethylene Oxide. Vinyl Acetate. Moisture. Halogenated compounds. Chloroform. Dichloromethane. Oxygen Difluoride.

Activated alumina adsorbs certain gases and liquids. While the alumina itself is principally inert, the bead/powder may exhibit properties of absorbed material. (3)

Decomposition or Combustion Products: Thermal decomposition products are toxic and may include oxides of aluminum and irritating gases.

11. TOXICOLOGICAL INFORMATION

Toxicological Data: None established for this product.

Aluminium Oxide Meaningful toxicological test data
could not be found for this substance.

Carcinogenicity Data: The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP. See "Other Studies Relevant to Material".

Reproductive Data: No adverse reproductive effects are anticipated.

Mutagenicity Data: No adverse mutagenic effects are anticipated.

Teratogenicity Data: No adverse teratogenic effects are anticipated.

Respiratory / Skin Sensitization Data: None known.

Synergistic Materials: None known.

Other Studies Relevant to Material: In animal studies, another insoluble Aluminum compound (Aluminum Hydroxide) was not embryotoxic or fetotoxic, unless administered in the presence of citric acid, lactic acid or ascorbic acid. In these cases, there was also maternal toxicity. Very high oral exposure of rats to soluble Aluminum compounds has caused fetotoxicity, in the absence of maternal toxicity. It is not known if Aluminum or its insoluble compounds would have a similar effect. (4)

An insoluble Aluminum compound (Aluminum Hydroxide) produced no evidence of embryo or fetotoxicity when administered orally to mice. However, when it was administered with common dietary constituents, such as citric acid, lactic acid and ascorbic acid, fetotoxicity was observed in the presence of maternal toxicity. These studies indicate that Aluminum absorption may be greatly enhanced by certain dietary constituents. Other reports have indicated that very high oral doses of soluble Aluminum compounds during lactation have caused fetotoxicity, in the absence of maternal toxicity. It is not known if Aluminum or its insoluble compounds would have a similar effect. (4)

Application of a compound containing 96.7 % atomized Aluminum caused irritation to the eyes, but no corneal opacity and cleared up within seven days. Slight inflammation and small lens opacity have been observed following implantation of Aluminum particles into the eye. No irritation was observed after application of a compound containing 96.7 % atomized Aluminum to intact or abraded skin. (4)

13. ECOLOGICAL INFORMATION

Ecotoxicity: Not available. May be harmful to aquatic life.

Environmental Fate: Not available. Can be dangerous if allowed to enter drinking water intakes. Product has an unaesthetic appearance and can be a nuisance. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

15. DISPOSAL CONSIDERATIONS

Deactivating Chemicals: None required.

Waste Disposal Methods: This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Small quantities (less than 25 Kg) of unused portions of this product may be discarded with normal, non-hazardous industrial wastes. Large quantities (25 Kg or more) of unused portions of this product may be discarded with normal, non-hazardous wastes, however such disposal should be cleared with the intended recipient. Disposal of post-service material must be done in accordance with local regulations.

The product may pose new hazards as a result of its use. It may be necessary to test the post-service flash point and/or leachable heavy materials, and/or benzene, toluene, ethylbenzene and xylene (BTEX) as well as total extractable hydrocarbons (TEH) and mineral oil and grease (MOG). Disposal may be dependent upon whether or not it meets regulatory criteria for control as a hazardous waste. The intended recipient should be consulted prior to initiating disposal.

Safe Handling of Residues: See "Waste Disposal Methods".

Disposal of Packaging: Empty containers retain product residue. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. Do not dispose of package until thoroughly washed out.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT / U.S. DOT CLASSIFICATION: Not regulated.

16. REGULATORY INFORMATION

CANADA

CEPA - NSNR: All constituents of this product are included on the DSL.
CEPA - NPRI: Aluminium Oxide.
Controlled Products Regulations Classification (WHMIS): D-2B: Toxic (Skin and Eye Irritant).

USA

Environmental Protection Act: All constituents of this product are included on the TSCA inventory.
OSHA Hazard Communication (29CFR 1910.1200) Classification: Skin and Eye Irritant.
HMIS: 1 Health, 0 Fire, 0 Reactivity. (3)

INTERNATIONAL: Aluminium Oxide is found on the following inventories: EINECS (European Inventory of Existing Commercial Chemical Substances), ACOIN (Australia), MITI (Japan) and Korea.

18. OTHER INFORMATION

ADDITIONAL INFORMATION AND SOURCES USED

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
 2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
 3. Supplier's Material Safety Data Sheet(s).
 4. "CHEMINFO", through "CCINFOdisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
 5. Guide to Occupational Exposure Values, 2005, American Conference of Governmental Industrial Hygienists, Cincinnati, 2005.
-

Page 8

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Xebec Inc. will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years.

To obtain revised copies of this or other Material Safety Data Sheets, contact Xebec Inc.