

MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Group
100 Bureau Drive, Stop 2321
Gaithersburg, Maryland 20899-2321

SRM Number: 699
MSDS Number: 699
SRM Name: Alumina (Reduction Grade)
Standard
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SECTION I. MATERIAL IDENTIFICATION

Material Name: Alumina (Reduction Grade)

Description: Each unit consists of 60 g alumina powder of which 95 % is less than 74 μm (No. 200).

Other Designations: Alumina (powdered alumina oxide)

Name	Chemical Formula	CAS Registry Number
Alumina	Al_2O_3	1344-28-1

DOT Classification: Not hazardous by DOT regulations

Manufacturer/Supplier: Available from a number of suppliers

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration* (%)	Exposure Limits and Toxicity Data
Alumina	~ 100 %	ACGIH TWA: 10 mg/m^3
Aluminum Oxide (Al_2O_3)	> 96	OSHA TWA: 5 mg/m^3 (respirable dust fraction)
Total Silica (SiO_2)	0.012	OSHA TWA: 15 mg/m^3 (total dust)
Titanium Dioxide (TiO_2)	< 3.0	Rat, Intrapleural: TD_{LO} : 90 mg/kg (tumorigenic data)
Iron Oxide (Fe_2O_3)	0.13	Rat, Implant: TD_{LO} : 200 mg/kg (tumorigenic data)
Calcium Oxide (CaO)	0.36	

* See the corresponding Certificate of Analysis for certified data.

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Alumina	
Appearance and Odor: solid, colorless to white amorphous, hygroscopic powder; odorless	Vapor Pressure (@ 2158 °C): 1 mm Hg
Relative Molecular Mass: 101.96	Evaporation Rate: not applicable
Density (water = 1): 3.965	Viscosity: not applicable
Boiling Point: 2980 °C	Water Solubility: insoluble
Melting Point: 2053 °C to 2072 °C	Solvent Solubility: slightly soluble in mineral acids and strong alkali

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Alumina

Flash Point: Not Applicable **Method Used:** Not Applicable **Autoignition Temperature:** Not Applicable

Flammability Limits in Air (Volume %): **UPPER:** Not Applicable
LOWER: Not Applicable

Unusual Fire and Explosion Hazards: Alumina is a negligible fire hazard. Alumina may ignite with chlorine trifluoride. An explosive mixture may form with alumina and sodium nitrate.

Extinguishing Media: Use extinguishing agents appropriate to the surrounding fire.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

SECTION V. REACTIVITY DATA

Stability: X **Stable** _____ **Unstable**

Conditions to Avoid: Avoid conditions which promote generating dust.

Incompatibility (Materials to Avoid): Alumina is incompatible with halo carbons, halogens, combustible materials, and oxidizing materials.

See Section IV: *Unusual Fire and Explosion Hazards*

Hazardous Decomposition or Byproducts: Thermal decomposition of alumina produce miscellaneous products.

Hazardous Polymerization: _____ **Will Occur** X **Will Not Occur**

SECTION VI. HEALTH HAZARD DATA

Route of Entry: X **Inhalation** X **Skin** X **Ingestion**

Alumina: Inhalations of high concentrations of alumina may cause coughing, shortness of breath, respiratory tract irritation due to mechanical action, unpleasant deposits in the nasal passages, and exacerbation of symptoms in persons with impaired pulmonary function. Metal fume fever, an influenza-like illness, may occur due to the inhalation of freshly formed metal oxide particles sized below 1.5 microns. Symptoms may develop with the onset of sudden thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing, and a dryness of the mucous membranes. Fever, chills, profuse sweating, excessive urination, diarrhea, and prostration may also occur. Tolerance to fumes develops rapidly, but is quickly lost. All symptoms usually subside in a 24 hour to 36 hour period. Metal fume fever is typically not chronic; however, repeated episodes with symptoms are common.

Skin and/or eye contact with alumina may cause irritation due to mechanical action. Ingestion of aluminum compounds may cause constipation.

Medical Conditions Generally Aggravated by Exposure: Respiratory disorders are aggravated by alumina.

Listed as a Carcinogen/Potential Carcinogen (Alumina):

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	_____	<u> X </u>
In the International Agency for Research on Cancer (IARC) Monographs	_____	<u> X </u>
By the Occupational Safety and Health Administration (OSHA)	_____	<u> X </u>

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration. Obtain medical assistance if necessary.

Ingestion: If ingested, wash out mouth with water. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK: upper respiratory tract (URT)

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of major spills and/or leaks. Evacuate nonessential personnel. Gather small spills and place into containers for disposal.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

This material should be stored in a cool, dry, well-ventilated area away from incompatible materials and conditions. Protect containers from physical damage.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Aluminum Oxide*, 22 March 2001.
Merck Index, 11th Ed., 1989.
The Sigma Aldrich Library of Chemical Safety Data, Ed. II, 1988.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data on the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.