

Aluminum hydroxide

sc-214529

Material Safety Data Sheet



The Power is Question

Hazard Alert Code Key: **EXTREME** **HIGH** **MODERATE** **LOW**

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Aluminum hydroxide

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

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EMERGENCY:

ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS

Al₂O₃·3H₂O, Al₂O₃·3HOH, Al-H3-O3, Al(OH)₃, Al₂-H6-O6, "aluminum hydroxide", "alumina hydrate", "Alcoa 331", "Alcoa C 30BF", "alumina hydrated", Alumigel, Alusal, Amphojel, "Amberol ST140F", "alumina trihydrate", "trihydrated alumina", "alpha-alumina trihydrate", "aluminic acid", "aluminium hydrate", "aluminium (III) hydroxide", "aluminium hydroxide gel", "aluminium hydroxide-3H₂O", "aluminium oxide hydrate", "aluminium oxide trihydrate", "aluminium trihydrate", hydraargillite, gibbsite, "aluminium trihydroxide", "hydrated aluminium oxide", t, rihydroxyaluminium, "British Aluminum AF 260", "Higilite H 32", "H 42", H31S, "Baco DH, DH101, AF220, AF230, AF240, AF260, AF280, FRF5, FRF10, FRF20, FRF30, ", "FRF40, FRF60, FRF80, FRF85, FRFLV2, FRFLV3, FRFLV4, FRFLV5, FRFLV6, FRFLV7, ", "FRFLV8, FRFLV9, SF4, SF7, SF11, SF4E, SF7E, SF11E, UF15, UF25, UV35, UF15E, ", "UF25E, UF35E, ME", "Hychol 705", "Hydral 705", 710, PGA, C330, Liquijel, "C.I. 77002", "Trihyde OL", 104E, OLQ107, "ATH, Bayer Hydrated Alumina, BayGraNite, Bayer Scals Fines, C-230, C231, ", "C-30, C-31, C-33, C-37G, C-330, C-331, C-40, C-430, C-431, C-530, C-", "531, ", "C-DPS-1, C-NEV-1, CHSO-1, CV-3002, CV-3003, CV-3004, Flame Gard 30, ", Hydral, "707, Hydral Brite 100, Hydral Coat Series, Hydrate 17LVB, HyGraNite, LD-5, ", "LD-100, OF-2000, Onyx Classica Series, PGA Spray Dried, 130, SpaceRite", "Series, SRP-A-11, SRP-A-12, SRP-A-13, SRP-A-14, SRP-A-17, SRP-A-18, ", SRP-A-89E, "Alternate CAS RN: 1302-29-0; 12252-70-9; 51330-22-4"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability:	0	■
Toxicity:	0	■
Body Contact:	2	■
Reactivity:	0	■

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4





CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Irritating to eyes.

Repeated exposure may cause skin dryness and cracking.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ The material has NOT been classified as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.

EYE

■ This material can cause eye irritation and damage in some persons.

SKIN

■ The material is not thought to produce adverse health effects or skin irritation following contact (as classified using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

■ Repeated exposure may cause skin cracking, flaking or drying following normal handling and use.

■ Open cuts, abraded or irritated skin should not be exposed to this material.

■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

■ The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

CHRONIC HEALTH EFFECTS

■ Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.

<\/p>

There are reports of lung damage due to excessive inhalation of alumina dust. Ingestion of large amounts of aluminium hydroxide for prolonged periods may cause phosphate depletion, especially if phosphate intake is low. This may cause loss of appetite, muscle weakness, muscular disease and even softening of the bones. These effects have not been reported in people occupationally exposed to aluminium hydroxide.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
aluminium hydroxide	21645-51-2	100
(as 2:1 Al:H ₂ O)		
gibbsite	14762-49-3	
and		
hydrargillite [CAS RN 14762-49-3]		
(as 1:2 Al:H ₂ O)		

Section 4 - FIRST AID MEASURES

SWALLOWED

· Immediately give a glass of water. · First aid is not generally required. If in doubt, contact a Poisons Information Center or a doctor.

EYE

■ If this product comes in contact with the eyes: · Wash out immediately with fresh running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN

■ If skin or hair contact occurs: · Flush skin and hair with running water (and soap if available). · Seek medical attention in event of irritation.

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Other measures are usually unnecessary.

NOTES TO PHYSICIAN

■ Treat symptomatically.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible
Upper Explosive Limit (%):	Not applicable
Specific Gravity (water=1):	2.4 @ 20 C
Lower Explosive Limit (%):	Not applicable

EXTINGUISHING MEDIA

· There is no restriction on the type of extinguisher which may be used.

Use extinguishing media suitable for surrounding area.

FIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.

· Wear breathing apparatus plus protective gloves for fire only.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Non combustible.

· Not considered to be a significant fire risk, however containers may burn.

Decomposition may produce toxic fumes of: metal oxides.

May emit poisonous fumes.

May emit corrosive fumes.

Aluminium hydroxide is a flame retardant. At around 200 C, aluminium hydroxide (aluminium trihydrate) is decomposed to aluminium oxide (which forms a protective, non-flammable layer on the material surface) and water. The water (as steam) forms a layer of non-flammable gas near the material's surface, inhibiting flames. The reaction is endothermic (absorbs heat energy), thus cooling the material and slowing burning.

FIRE INCOMPATIBILITY

■ None known.

PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

Respirator:

Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

· Clean up all spills immediately.

· Avoid breathing dust and contact with skin and eyes.

MAJOR SPILLS

■ Moderate hazard.

· CAUTION: Advise personnel in area.

· Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

· Avoid all personal contact, including inhalation.

· Wear protective clothing when risk of exposure occurs.

RECOMMENDED STORAGE METHODS

· Polyethylene or polypropylene container.

· Check all containers are clearly labelled and free from leaks.

STORAGE REQUIREMENTS

· Store in original containers.

· Keep containers securely sealed.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA mg/m ³	STEL mg/m ³	Notes
Canada - Prince Edward Island Occupational Exposure Limits	aluminium hydroxide (Aluminum - Insoluble compounds)	1		TLV Basis: Pneumoconiosis; lower respiratory tract irritation; neurotoxicity
US ACGIH Threshold Limit Values (TLV)	aluminium hydroxide (Aluminum - Insoluble compounds)	1		TLV Basis: Pneumoconiosis; lower respiratory tract irritation; neurotoxicity
Canada - Nova Scotia Occupational Exposure Limits	aluminium hydroxide (Aluminum - Insoluble compounds)	1		TLV Basis: Pneumoconiosis; lower respiratory tract irritation; neurotoxicity
US - California Permissible Exposure Limits for Chemical Contaminants	aluminium hydroxide (Aluminum welding fumes)	5		
Canada - British Columbia Occupational Exposure Limits	aluminium hydroxide (Aluminum metal and insoluble compounds, Respirable, Revised 2008)	10		
US - Oregon Permissible Exposure Limits (Z-3)	aluminium hydroxide (Inert or Nuisance Dust: Total dust)	10		(d)
US OSHA Permissible Exposure Levels (PELs) - Table Z3	aluminium hydroxide (Inert or Nuisance Dust: (d) Respirable fraction)	5		
US OSHA Permissible Exposure Levels (PELs) - Table Z3	aluminium hydroxide (Inert or Nuisance Dust: (d) Total dust)	15		
US - Hawaii Air Contaminant Limits	aluminium hydroxide (Particulates not other wise regulated - Total dust)	10		
US - Hawaii Air Contaminant Limits	aluminium hydroxide (Particulates not other wise regulated - Respirable fraction)	5		
US - Oregon Permissible Exposure Limits (Z-3)	aluminium hydroxide (Inert or Nuisance Dust: Respirable fraction)	5		(d)
Canada - Nova Scotia Occupational Exposure Limits	aluminium hydroxide (Particles (Insoluble or Poorly Soluble) [NOS] Respirable particles)	3		See Appendix B current TLV/BEI Book
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	aluminium hydroxide (Particulates Not Otherwise Classified (PNOC))	10		
Canada - British Columbia Occupational Exposure Limits	aluminium hydroxide (Particles (Insoluble or Poorly Soluble) Not Otherwise Classified (PNOC))	10 (N)		
US - Washington Permissible exposure limits of air contaminants	aluminium hydroxide (Particulates not otherwise regulated - Total particulate)	10	20	
US - Washington Permissible exposure limits of air contaminants	aluminium hydroxide (Particulates not otherwise regulated - Respirable fraction)	5	10	
Canada - Nova Scotia Occupational Exposure Limits	aluminium hydroxide (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles)	10		See Appendix B current TLV/BEI Book

US ACGIH Threshold Limit Values (TLV)	aluminium hydroxide (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles)	10	See Appendix B current TLV/BEI Book
US - California Permissible Exposure Limits for Chemical Contaminants	aluminium hydroxide (Particulates not otherwise regulated Respirable fraction)	5	(n)
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	aluminium hydroxide (Particulates not otherwise regulated Respirable fraction)	5	
US - Michigan Exposure Limits for Air Contaminants	aluminium hydroxide (Particulates not otherwise regulated, Respirable dust)	5	
Canada - Prince Edward Island Occupational Exposure Limits	aluminium hydroxide (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles)	10	See Appendix B current TLV/BEI Book
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	aluminium hydroxide (Particulates not otherwise regulated (PNOR)(f)-Respirable fraction)	5	
US ACGIH Threshold Limit Values (TLV)	gibbsite (Aluminum - Insoluble compounds)	1	TLV Basis: Pneumoconiosis; lower respiratory tract irritation; neurotoxicity
Canada - Prince Edward Island Occupational Exposure Limits	gibbsite (Aluminum - Insoluble compounds)	1	TLV Basis: Pneumoconiosis; lower respiratory tract irritation; neurotoxicity
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US OSHA Permissible Exposure Levels (PELs) - Table Z3	gibbsite (Inert or Nuisance Dust: (d) Respirable fraction)	5	
US OSHA Permissible Exposure Levels (PELs) - Table Z3	gibbsite (Inert or Nuisance Dust: (d) Total dust)	15	
US - Hawaii Air Contaminant Limits	gibbsite (Particulates not other wise regulated - Total dust)	10	
US - Hawaii Air Contaminant Limits	gibbsite (Particulates not other wise regulated - Respirable fraction)	5	
US - Oregon Permissible Exposure Limits (Z-3)	gibbsite (Inert or Nuisance Dust: Respirable fraction)	5	(d)
Canada - Nova Scotia Occupational Exposure Limits	gibbsite (Particles (Insoluble or Poorly Soluble) [NOS] Respirable particles)	3	See Appendix B current TLV/BEI Book
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	gibbsite (Particulates Not Otherwise Classified (PNOC))	10	
Canada - British Columbia Occupational Exposure Limits	gibbsite (Particles (Insoluble or Poorly Soluble) Not Otherwise Classified (PNOC))	10 (N)	

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US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	gibbsite (Particulates not otherwise regulated Respirable fraction)	5		
US - Michigan Exposure Limits for Air Contaminants	gibbsite (Particulates not otherwise regulated, Respirable dust)	5		
Canada - Prince Edward Island Occupational Exposure Limits	gibbsite (Particulates (Insoluble or Poorly Soluble) [NOS] Inhalable particles)	10		See Appendix B current TLV/BEI Book
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	gibbsite (Particulates not otherwise regulated (PNOR)(f)- Respirable fraction)	5		

ENDOELTABLE

PERSONAL PROTECTION



RESPIRATOR

Particulate

Consult your EHS staff for recommendations

EYE

- Safety glasses with side shields.
- Chemical goggles.

HANDS/FEET

- Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
 - frequency and duration of contact,
 - chemical resistance of glove material,
 - glove thickness and
 - dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.

- polychloroprene
- nitrile rubber
- butyl rubber
- fluorocautchouc
- polyvinyl chloride

Gloves should be examined for wear and/ or degradation constantly.

OTHER

- Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

ENGINEERING CONTROLS

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.

Does not mix with water.

Sinks in water.

State	Divided solid	Molecular Weight	78.00
Melting Range (°F)	3722	Viscosity	Not Applicable
Boiling Range (°F)	Not available.	Solubility in water (g/L)	Immiscible
Flash Point (°F)	Not Applicable	pH (1% solution)	5.5 - 9 (gel)
Decomposition Temp (°F)	>392 (-H ₂ O)	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not applicable	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not applicable	Specific Gravity (water=1)	2.4 @ 20 C
Lower Explosive Limit (%)	Not applicable	Relative Vapor Density (air=1)	Not applicable.
Volatile Component (%vol)	Negligible	Evaporation Rate	Not Applicable

APPEARANCE

White to off-white crystalline powder, balls or granules with no odour. Available as a range of grades; Technical, BP. Available as a bulky amorphous powder. Commercially available as a gel (containing various ratios of aluminium oxides and water of hydration). Insoluble in water; forms a gel (Al₂-O₃.xH₂O) on long contact with water. Slightly soluble in acidic and alkaline solutions. Soluble in strong acids and strong alkalis. Insoluble in alcohol. Loses water of hydration on heating over 200 C. Analysed as 65% aluminium oxide and water when Al-(OH)₃. Natural minerals gibbsite and hyrargillite crystals are Al₂-O₃.3H₂O [CAS 14762-49-3] and have 35% aluminium oxide and water.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.

STORAGE INCOMPATIBILITY

- Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
- These trifluorides are hypergolic oxidisers. They ignites on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition.
- The state of subdivision may affect the results.

Avoid storage with chlorinated rubber or bismuth hydroxide.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

ALUMINIUM HYDROXIDE

TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Intraperitoneal (Rat) LD: 150 mg/kg	

Section 12 - ECOLOGICAL INFORMATION

No data

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

! Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.

Section 14 - TRANSPORTATION INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: DOT, IATA, IMDG

Section 15 - REGULATORY INFORMATION



REGULATIONS

aluminium hydroxide (CAS: 21645-51-2,1330-44-5,1302-29-0,12252-70-9,51330-22-4) is found on the following regulatory lists;

"Canada Domestic Substances List (DSL)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "International Council of Chemical Associations (ICCA) - High Production Volume List", "OECD Representative List of High Production Volume (HPV) Chemicals", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US Food Additive Database", "US Toxic Substances Control Act (TSCA) - Inventory"

Regulations for ingredients

gibbsite (CAS: 14762-49-3) is found on the following regulatory lists;

"Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Cumulative effects may result following exposure*.

* (limited evidence).

Ingredients with multiple CAS Nos

Ingredient Name CAS aluminium hydroxide 21645-51-2, 1330-44-5, 1302-29-0, 12252-70-9, 51330-22-4

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- Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references.

- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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