



## W. R. Grace & Co.-Conn. Sodium Aluminate Product Stewardship Summary

### I. Overview

W. R. Grace & Co.-Conn manufactures a limited amount of aqueous sodium aluminate for commercial customers and does not directly supply to the public. Sodium aluminate is produced when aluminum metal reacts with an aqueous solution of sodium hydroxide, creating a strong alkaline or basic liquid. Sodium aluminate, primarily in the liquid form, is used in a variety of controlled industrial uses.

### II. Chemical Identity – Physical and Chemical Properties

#### Chemical Identity:

CAS# (EC inventory):	1302-42-7
CAS Name:	Sodium aluminate
EC Number:	215-100-1
EC Name:	Sodium aluminate
RTECS Number:	BD1600000
Molecular Formula:	NaAlO <sub>2</sub>
Molecular Weight:	81.9701

**Synonyms:** aluminum sodium oxide, sodium aluminum dioxide, aluminum sodium dioxide

**Physical and Chemical Properties:** Sodium aluminate is an inorganic chemical that in pure form is a white, hygroscopic and water soluble powder. It may generate heat when mixed with water and reacts exothermically with acids. It is corrosive in both solid and liquid forms. It is non-combustible however, if heated to decomposition it may produce corrosive and or toxic fumes. Most sodium aluminate placed onto the market is the aqueous form with typical concentrations of 25-50%.

### **III. Applications**

Sodium aluminate has broad range of uses. Major applications include use in water and wastewater treatment applications, in papermaking, and as a raw material intermediate in commercial industries. In municipal drinking water and waste water treatment systems it serves as a clarifying aid and assists in the removal of phosphates and fluorides in municipal and industrial wastewater plants. In the paper industry it increases the opacity retention of fibers and filling material & paper strength. Other applications include use in paint processing, synthetic zeolite and catalyst manufacturing, as a cement or concrete additive, for surface treatment and in the manufacture of industrial detergents. It also finds uses in the textile, dye/printing and pharmaceutical industries.

### **IV. Manufacturing Processes**

Sodium aluminate may be manufactured by several methods. The typical manufacturing process is to dissolve aluminium hydroxide in excess sodium hydroxide solution or the production by treatment of aluminum metal with sodium hydroxide. When a solid product is manufactured, the semi-products are dehydrated by heating or evolution of hydrogen. The sodium aluminate manufactured by Grace is a byproduct generated during the production of Raney<sup>®</sup> catalysts.

### **V. Health Effects**

Liquid sodium aluminate must be handled with care due to its corrosive nature. It is corrosive to the eyes, the skin, and the respiratory system and if ingested therefore, direct contact must be prevented. Flushing with water can minimize exposure by utilizing the high solubility of the substance in water to dilute the concentration. Being a corrosive substance repeated or prolonged exposure may cause inflammatory and ulcerative changes in the mouth and possibly bronchial and gastrointestinal disturbances. The substance is not classifiable as a human carcinogen or mutagen nor does it pose reproductive risks. It is not sensitizing to the skin or respiratory system. Sodium aluminate may release toxic vapors if decomposed in a fire. The potential for occupational exposures are addressed by the use of engineering controls, safe work practices and personal protective equipment.

### **VI. Environmental Effects**

As a highly corrosive material care should be taken to insure appropriate materials are used for storage of the substance. Sodium aluminate is stable only under alkaline conditions. In aqueous solutions at natural pH sodium aluminate decomposes rapidly to sodium and hydroxyl ions and various species of aluminium depending upon many factors, especially pH, alkalinity, temperature, dissolved organic carbon, dissolved inorganic carbon and anion concentration. If released into the environment the aluminium hydroxide will precipitate in aquatic system or deposit as aluminium oxide in sediment or soil. The sodium portion will be found dissociated as sodium ions

predominantly in water. If released to the soil, and depending on the buffer capacity of the soil, sodium aluminate will be neutralised and will decompose to aluminium hydroxide or oxide, both of which are stable and can become immobilized in soil. Due to instability, sodium aluminate is found in the environment as its decomposition products, for which the aluminium compounds are considered to be the only relevant regards environmental exposure. If released to water in large volumes the alkaline properties of sodium aluminate may impact the pH of the water system however sodium aluminate is not classified as hazardous to the environment.

## VII. Conclusion

Grace applications of sodium aluminate are limited to uses in industrial settings, where engineering controls and the use of personal protective equipment are employed to minimize the impact of chemicals on human beings or the environment. Because the hazards of sodium aluminate are primarily related to direct exposure the potential risk to the public from material manufactured by Grace is considered minimal.

## VIII. W. R. Grace Contacts

Please feel free to contact one of the following Grace representatives should you desire additional information or have questions.

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## IX. References, Literature and Other Sources of Information

National Oceanic and Atmospheric Administration, CAMEO Chemicals version 2.4.1.  
(<http://cameochemicals.noaa.gov/chemical/1468>) and  
(<http://cameochemicals.noaa.gov/chemical/1469>)

<http://www.cdc.gov/niosh/ipcsneng/neng0566.html>

National Center for Biotechnology Information, U.S. National Library of Medicine.  
Compound Summary for: CID 14766, sodium aluminate  
(<http://pubchem.ncbi.nlm.nih.gov/summary/summary.cgi?cid=14766>)

European Chemicals Agency registered substances webpage:  
<http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances>

ATSDR (Agency for Toxic Substances and Disease Registry) (2008). Toxicological Profile for Aluminium. Atlanta,: Department of Health and Human Services, Public Health Service.

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