



W. R. Grace & Co.-Conn. Aluminum Chlorohydrate Product Stewardship Summary

I. Overview

W. R. Grace & Co.-Conn. produces a solution form of aluminum chlorohydrate as an intermediate substance used in the manufacture of Fluid Catalytic Cracking (FCC) catalysts. Grace does not commercially supply aluminum chlorohydrate and this substance is not present in any of the products Grace places into the marketplace.

II. Chemical Identity – Physical and Chemical Properties

Chemical Identity:

CAS# (EC inventory):	12042-91-0
CAS Name:	Dialuminium chloride pentahydroxide
EC Number:	234-933-1
EC Name:	Dialuminium chloride pentahydroxide
Molecular Formula:	Al ₂ ClH ₉ O ₅
Molecular Weight:	174.45

Synonyms: Aluminum chlorhydrate, pentahydroxy dialuminum chloride, chloropentahydroxydialuminum, aluminum hydroxide chloride, aluminum hydroxychloride, aluminum monochloride pentahydroxide, aluminum chlorhydroxide, aluminum chloride hydroxide

Physical and Chemical Properties:

- Solid, white crystalline powder
- Density: 1.35-1.95 g/cm³ at 20°C
- Melting Point: > 400 °C
- Boiling Point: >400 °C
- Solubility: >1000 g/L at 20 °C and pH = 3.3

In solid form aluminum chlorohydrate is an odorless and colorless to light yellow crystalline solid or powder. The material is not highly reactive and is not flammable. Thermal decomposition can result in formation of chlorine compounds and metal oxides.

III. Applications

Aluminum chlorohydrate is primarily used as an ingredient in antiperspirant and deodorant preparations, and is also used for water purification and treatment of sewage and plant effluent. In water treatment, aluminum chlorohydrate is used as a flocculant to encourage impurities in the water to clump together into flakes of material which can easily be removed. Aluminum chlorohydrate is used by Grace in the production of catalysts for the refining industry.

IV. Manufacturing Processes

Aluminum metal is reacted with an aqueous solution of hydrochloric acid to create aluminum chlorohydrate, which is subsequently combined with the main ingredients found in catalysts for Fluid Catalytic Cracking (FCC) units. The FCC unit is a key step in the refining process to make transportation fuels. During the FCC catalyst manufacturing process, the aluminum chlorohydrate is decomposed at high temperature to form an alumina based binder, which holds the main ingredients together.

V. Health Effects

Aluminum chlorohydrate is one of several similar aluminum compounds. Aluminum (Al) is the most commonly occurring metallic element, comprising eight percent of the earth's crust and is therefore found in great abundance in both the terrestrial and sediment environments with concentrations of 3-8% not uncommon. Because of its environmental abundance, human exposure to aluminum on a daily basis is difficult to avoid. The major route of exposure to aluminum to the general population is through food. Foods with very high aluminum concentrations include tea leaves, herbs and cocoa. Other amounts may come from food additives and pharmaceuticals, such as over-the-counter medications used for heartburn.

Aluminum chlorohydrate is not toxic and although it may cause mild, transient irritation to the eyes and skin it is not classified as an eye or skin irritant. Allergic sensitivity to aluminum chlorohydrate is very rare considering the extent of exposure from antiperspirants. Solutions of aluminum chlorohydrate such as those employed by Grace have a pH of 3-5, compared to a common household reference of lemon juice, which has a pH slightly below 3. Aluminum chlorohydrate is not classified as carcinogenic by IARC, NTP, OSHA, or ACGIH. It is also not mutagenic or toxic for reproduction nor is there any evidence of chronic toxicity.

VI. Environmental Effects

The primary risk for environmental impact from aluminum chlorohydrate would be if the substance comes into contact with water. Any material that does reach a water course

would dissolve if a solid, and all material would disassociate into aluminum and chloride ions. The aluminum species present would be dependent upon the pH of the water into which it is released.

The available evidence shows the absence of aluminum bioaccumulation and biomagnification in both aquatic and terrestrial food chains. In general, metals do not biomagnify unless they are present as, or having the potential to be, in an organic form such as methyl mercury.

The available data also indicates that aluminum salts are relatively non toxic in most waters. The potential for environmental toxicity is not considered significant because for an aluminum salt to present a toxic hazard to any environmental species very specific and uncommon conditions such as a very low pH, low oxygen and organic matter content coupled with very low background levels of aluminum must exist. Additionally, such conditions would need to result in dissolved aluminum concentrations in the order of magnitude where toxicity occurs, which would not be expected to arise from the industrial production and use patterns of the aluminum chlorohydrate manufactured and used by Grace.

VII. Conclusion

Based on its use as an intermediate, its chemical and physical properties, coupled with its toxicological profile and the fact it is employed only in industrial settings the aluminum chlorohydrate manufactured by Grace is not expected to pose a significant risk to the public or the environment.

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

ATSDR: Agency for Toxic Substances and Disease Registry, U.S. Dept. of Health and Human services, Public Health Service (2008), Toxicological Profile for Aluminum.
<http://www.atsdr.cdc.gov/hazdat.html>.

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Compound Summary for: Aluminum chlorohydrate
<http://chem.sis.nlm.nih.gov/chemidplus/rn/12042-91-0>

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