



W. R. Grace & Co.-Conn. Boehmite Product Stewardship Summary

I. Overview

W. R. Grace & Co.-Conn. uses synthesized boehmite as a raw material for production of a wide range of alumina-based catalyst products that are used in the refining and petrochemical industries. Boehmite provides unique properties that enhance the performance of the catalysts. It is typically completely converted to another form of alumina when these catalysts are made, and with a few exceptions it is not present in any such finished products manufactured by Grace. Grace does not commercially supply boehmite and it is not present in any Grace product used by the general public.

II. Chemical Identity – Physical and Chemical Properties

Chemical Identity:

CAS# (EC inventory):	1318-23-6
CAS Name:	Boehmite
EC Number:	215-284-3
EC Name:	Boehmite (Al(OH)O)
Molecular Formula:	AlHO ₂
Molecular Weight:	59.9883

Synonyms: Boehmite (Al(OH)O), aluminium oxide hydroxide, aluminum hydroxide oxide, aluminum oxyhydroxide, pseudoboehmite, aluminum oxide monohydrate, aluminum monohydrate, aluminum oxygen(2-) hydroxide, hydroxy(oxo)aluminum

Physical and Chemical Properties:

- Solid, white powder
- Density: 400-800 kg/m³ at 20°C
- Melting Point: decomposes at temperature >340°C into water (H₂O) and aluminum oxide (Al₂O₃)
- Boiling Point: N/A
- Solubility: insoluble (< 0.1 mg/L)

Boehmite is a stable substance and is not explosive or flammable.

III. Applications

Boehmite (alumina) is a crystalline form of aluminum oxides and hydroxides. Aluminum (Al) is the most commonly occurring metallic element, comprising approximately eight percent of the earth's crust. It is a major component of almost all common inorganic soil particles with a few exceptions to include quartz sand. Inorganic salts of aluminum are found everywhere in the environment. In addition to naturally occurring boehmite there are forms that are chemically synthesized. Synthesized boehmite has historically been primarily used as a support or binder for catalysts in both refinery and other chemical applications. Grace uses of boehmite are limited to material that is chemically synthesized.

Typical applications for boehmite alumina include sol-gel ceramics, as a binder for catalysts, refractory materials, rheology control, surface frictionizing and paint detackification, as well as surface coating and polymer additives. Boehmite is used internally by Grace in the production of a wide variety of catalysts and is not typically present in the finished products.

IV. Manufacturing Processes

Boehmite is employed by Grace as a raw material used in the production of a wide range of alumina-based catalysts. Boehmite provides unique properties that enhance the manufacturing of the catalysts. Important attributes of catalysts such as surface area and porosity are modified by incorporating boehmite into the catalyst raw materials, thereby improving the performance of the finished product catalysts. Boehmite is typically completely converted into gamma alumina when the catalysts are made, and therefore, with a few exceptions, is not present in any Grace finished products.

V. Health Effects

Although, Boehmite itself has not undergone extensive testing, other forms of aluminum oxides and hydroxides have been extensively tested in both animals and human beings. Some very common antacid preparations sold without prescriptions are comprised of aluminum hydroxide gels. These have been in routine use for decades and enjoy a very safe toxicology profile.

There are very few reports of aluminum intoxication in human beings. Such reports are confined to individuals with kidney failure who may consume aluminum products, or be exposed to aluminum in dialysis fluid, and they are unable to excrete aluminum in the urine. Apart from this rare circumstance, exposures to alumina and aluminum oxides are well tolerated in human beings and in animal toxicology studies.

Toxicology testing in animals shows that aluminum oxides and hydroxides are essentially non-toxic. Effects can only be demonstrated by massive over exposures to these compounds. The fine dust of alumina may be irritating to the eyes and respiratory track but do not possess any lingering toxic attributes. Aluminum oxides and hydroxides are neither mutagenic nor carcinogenic and do not interfere with normal reproduction in animal models or in human experience.

VI. Environmental Effects

Boehmite is insoluble in water. It is relatively inert in the environment and cannot be easily distinguished from naturally occurring aluminum salts in the earth's crust. Boehmite is a very stable compound, as evidenced by loss of water and decomposition which starts at 340°C. As an inorganic substance, boehmite is not subject to biodegradation or photo degradation. Acute and chronic testing has shown aluminum oxides and hydroxides are of very low or non-toxic to aquatic organisms therefore due to similarities in these substances boehmite would be expected to have similar toxicological properties.

VII. Conclusion

Boehmite is used internally by Grace in the production of a wide variety of Grace catalysts. The boehmite employed by W.R. Grace is safe and contributes to the standard of living in a wide range of applications. The principal known risk to human health presented by boehmite is the concentration of dust in the air which acts as a nuisance dust. Based on its chemical and physical properties coupled with its toxicological and ecotoxicological profile the boehmite used by Grace does not pose a risk to the environment or to the public.

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) (2008). Toxicological Profile for Aluminium. Atlanta,; Department of Health and Human Services, Public Health Service.

European Chemicals Agency registered substances webpage:

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

HazDat. 2008. Aluminum. HazDat Database: ATSDR's Hazardous Substance Release and Health Effects Database. Atlanta, GA: Agency for Toxic Substances and Disease Registry. <http://www.atsdr.cdc.gov/hazdat.html>. June 19, 2008

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