RESONAC

GPS/JIPS Safety Summary

1. PRODUCT NAME

Alumina (aluminum oxide) (CAS No.: 1344-28-1)

2. GENERAL STATEMENT

Alumina is a white-colored, powdery crystalline formed through the calcination of aluminum hydroxide. Numerous crystalline forms of alumina are known of, but the most stable and widely used is alpha alumina. Alpha alumina has a high melting point, is thermally stable, has a hardness next to that of diamond, is high in electric insulation and resistance properties, and remains stable in the presence of acids and alkalis.

3. CHEMICAL IDENTITY

Item	Description
Chemical or generic name	Aluminum oxide
Trade name	Alumina (aluminum oxide)
CAS No.	1344-28-1
Other Nos.	Japan: Chemical Substances Control Law (1)-23 Japan: Industrial Safety and Health Act, existing chemical substance
Chemical Formula	Al_2O_3
Source/References	Section 3 of the SDS issued by Resonac Corporation

4. USES AND APPLICATIONS

Main uses	Our product has mainly been used with fire-proof materials, insulators, spark plugs, IC substrates and packages, drilling and polishing materials, and in ceramics for heat and chemical resistant products, etc.

5. PHYSICAL/CHEMICAL PROPERTIES

The substance is a white-colored odorless powder that hardly dissolves in water.

Appearance	Powder
Color	White
Odor	Odorless
Melting point/Boiling point	2053 ℃／3000 ℃
Flammability	Non flammable
Relative density	3.98g/cm^3(20℃)
Solubility	Water: Insoluble, Acid: Insoluble, Alkali: Very slightly soluble. Other solvents: no data available
Explosive properties	Not explosive
Oxidizing proparties	Not oxidizing
Sources/references	Section 9 and 10 of the SDS issued by Resonac Corporation

6. HEALTH EFFECTS

Effect assessment	Results （GHS Hazard Classification）

Acute toxicity (oral)	Not classified
Acute toxicity (dermal)	Classification not possible
Acute toxicity (inhalation: gas)	Not applicable
Acute toxicity (inhalation: vapours)	Classification not possible
Acute toxicity (inhalation: dust, mist)	Classification not possible
Skin corrosion/irritation	Not classified
Serious eye damage/eye irritation,	Not classified
Respiratory sensitisation	Classification not possible
Skin sensitisation	Classification not possible
Germ cell mutagenicity	Classification not possible
Carcinogenicity	Classification not possible
Reproductive toxicity	Classification not possible
Specific target organ toxicity — Single exposure,	Category 3 May cause respiratory irritation
Specific target organ toxicity (repeated exposure)	Category 1 Causes damage to organs (lungs) through prolonged or repeated exposure (Inhalation).
Aspiration hazard	Classification not possible
Sources/references	Section 2 and 11 of SDS issued by Resonac Corporation

・ GHS (Globally Harmonized System of Classification and Labelling of Chemicals): A system that classifies chemicals according to the type and degree of hazards, labels the information, and provides safety data sheets according to globally harmonized rules.
・ Not applicable: Since the priority of physical state, chemical structure, chemical property, and hazard items used in the GHS classification procedures does not fall under the category, it is not subject to the classification for the category.
・ Not classified: Sufficient information has been obtained to implement the GHS classification, and as a result of the classification, it does not fall under any of the hazard categories specified in the GHS. ・ Classification not possible : There is not enough information for GHS classification, and classification is not possible.

7. ENVIRONMENTAL EFFECTS

Effect assessment	Results (GHS Hazard Classification)
Hazardous to the aquatic environment, short-term (acute)	Not classified
Hazardous to the aquatic environment, long-term (chronic)	Classification not possible
Hazardous to the ozone layer	Classification not possible
Sources/references	Sections 2 and 12 of the SDS issued by Resonac Corporation

Environmental fate/dynamics	
Mobility in soil	No additional information available.
Persistence/degradability	No additional information available.
Bioaccumulation potential	No additional information available.
Conclusion about PBT/vPvB	The criteria for persistent bioaccumulative and toxic (PBT; remaining persistently in the environment and possessing high bioaccumulation potential and toxicity) and very persistent and very bioaccumulative (vPvB; remaining very persistently in the environment and possessing very high bioaccumulation potential) chemicals are believed to inapplicable.
Sources/references	Sections 12 of the SDS issued by Resonac Corporation

8. EXPOSURE

Detals	Exposure potentials through main uses
Occupational exposures	When handling powders of the substance under normal temperatures, workers could be exposed through oral ingestion, contact with the skin, or inhalation if dust is generated during mixing/blending, measuring, packing, unpacking and other processes involving the substance. Harmful effects have been recognized mainly when the substance's high-density dust was inhaled. This may cause coughing and shortness of breath. Additionally, the substance could cause irritation in direct contact with the respiratory tracts, eyes and skin. However, the harmful effects resulting from oral intake of the substance are believed to be minor.
Consumer exposures	The substance is used as a source material for heat and chemical resistant ceramics and other products, so there is the potential that consumers could be exposed through dermal of inhalation. Harmful effects have been recognized mainly when its high-density dusts were inhaled, and this could cause coughing and shortness of breath. The substance could also irritate respiratory tracts, as well as the eyes and skin upon direct contact. The harmful effects resulting from oral ingestion are believed to be minor.
Environmental exposures	Although environmental exposure is possible in the following cases, no specific effects on the environment have been reported, as mentioned in Section 7 Environmental Effects.
Precautions	If there is a possibility of exposure in other uses, take appropriate measures with reference to recommended risk management measures.

9. RISK MANAGEMENT RECOMMENDATIONS

Recommended risk management measures can minimize risks to workers, consumers, and the environment from Section 8 exposure scenarios.

Detals	Risk management recommendations
Worker	Technical measures: Carry out exhaust ventilation in order to keep a concentration of the substance in the air below the exposure limit value. Install eyewash fountains and safety showers at manufacturing places where the product is stored or handled.
	Local and general ventilation: For controlling and restricting environmental concentrations below the following recommended values, install local exhaust or total ventilation systems at places where the product is manufactured or handled.
	Acceptable concentration: With regard to the product, the Japan Society for Occupational Health published (in 2011) the recommendation values as occupational exposure limits of 0.5 mg/m3 for respirable dust (class 1 dusts) and 2 mg/m3 for total dust (class 1 dusts), while the American Conference of Governmental Industrial Hygienists

	(ACGIH) published the threshold limit value of 1 mg/m3 (time-weighted average; TLV-TWA). Implement management and control measures to keep its dust concentration below these values.
	Protective equipment: While working, wear appropriate protective eyewears, dust-proof masks, air-supplied respirators, clothes and protective gloves made of materials impermeable to powders.
	Precautions: The operation manager should educate operators about the selection of appropriate protective equipment, proper usage method, and control method of the work site.
Consumer	If dusts have been generated, take a precaution not to inhale its dusts and not to directly contact with its dusts on the human body. If the exposure amount is large, implement risk management measures similar to those indicated in “Occupational Exposures” above.
Environment	In order to prevent environmental exposures, implement preventive measures against leakage into rivers, water channels, and sewerage trenches, and pay attention to the daily management and handling of the substance.
Precautions	For normal handling, emergency response, disposal, and transportation control measures, refer to sections 4, 5, 6, 7, 8, 13, and 14 of the SDS issued by Resonac Corporation.

10. STATE AGENCY REVIEW

Hazard assessment	Situations of review
International Chemical Safety Cards	International Chemical Safety Card https://www.ilo.org/dyn/icsc/showcard.display?p_lang=en&p_card_id=0351
OECD HPV	High production volume chemical testing programme https://hpvchemicals.oecd.org/ui/search.aspx
NITE-CHRIP(NITE Chemical Risk Information Platform)	https://www.nite.go.jp/en/chem/chrip/chrip_search/srhInput
GHS Classification Results by the Japanese Government	https://www.nite.go.jp/chem/english/ghs/06-imcg-0730e.html

11. REGULATORY INFORMATION／GHS CLASSIFICATION AND LABELLING INFORMATION

Regulatory information only in Japan

Applicable laws	Regulatory situations
Industrial Safety and Health Act	Dangerous or Harmful Substances Subject to Be Indicated their Names(Article 57 Paragraph (1) of the Act, Article 18 item(ｉ) and item(ii) appended Table No. 9 of the Enforcement Order) Aluminum oxide

	Dangerous Articles and Harmful Substances Whose Names, etc. Should Be Notified(Article 57-2 of the Act, Article 18-2 item(ⅰ) and item(ⅱ) appended Table No. 9 of the Enforcement Order) Aluminum oxide(Cabinet Order Number : 189)
Poisonous and Deleterious Substances Control Act	Not applicable
Water Pollution Prevention Act	Designated substances(Article 2, Paragraph 4 of the Acr, Article 3-3 of the Enforcement Order) aluminum and aluminum compounds
Foreign Exchange and Foreign Trade Act	Paragraph 16 of Appended Table 1 of the Cabinet Order on Export Trade Control
Water Supply Act	Hazardous Substances (Article 4, Paragraph 2 of the Act), Water Quality Standards (Ordinance of the Ministry of Health, Labour and Welfare No. 101 of 2003) Aluminum and aluminum compounds
Act on the Assessment of Releases of Specified Chemical Substances in the Environment and the Promotion of Management Improvement and Transfer Register / PRTR)	Not applicable
Pneumoconiosis Law	Article 2 of the Act, Article 2 of the Enforcement Ordinance, Appended Table Dusty work alumina
UN classification	Not applicable

azards	Classification results (hazard information)
Health hazards	Specific target organ toxicity — Single exposure Category 3 (Respiratory tract irritation)
	Specific target organ toxicity (repeated exposure) Category 1 (lung)

Labelling Information	
Hazard pictograms (GHS)	
Signal word (GHS)	Danger
Hazard statements (GHS)	May cause respiratory irritation (H335) Causes damage to organs (lungs) through prolonged or repeated exposure (Inhalation). (H372)

12. CONTACT INFORMATION

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13. DATE OF ISSUE / REVISION, ADDITIONAL INFORMATION

Date of issue: November 28, 2013

Revisions:

Date of revision	Revised section	Revised item	Version
January 1, 2023	3, 6, 11, 13	update to the latest information	Rev.2

The contents are based on the safety data sheet (SDS) revised on January 1, 2023.

Special instructions: none

14. DISCLAIMER

The safety summary is part of the effort for the voluntary management of chemical substance in the chemical industry (GPS/JIPS: Japan Initiative of Product Stewardship). The purpose of the safety summary is to provide information on the safe handling of the product as an overview and not to provide professional information, such as the risk evaluation process and its impact on human health and the environment. This document is not meant to serve as an alternative to risk evaluation, such as a Safety Data Sheet (SDS) or a Chemical Safety Report (CSR). This safety summary is being written as accurately as possible based on data such as laws, materials, and information available at the time of publication, but it does not include all data. It does not guarantee anything.