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PRODUCT STEWARDSHIP SUMMARY: PYROGENIC SILICA

Overview

This Product Stewardship Summary refers to Cabot Corporation's CAB-O-SIL® Untreated Fumed Silica products, which are dry powders; and CAB-O-SPERSE® Untreated Fumed Silica products, which are dispersions of these powders in water.

Cabot Corporation's pyrogenic silica (also called untreated fumed silica) is a form of synthetic amorphous silica (SAS) that is used in a wide variety of industrial and consumer applications. Industrial applications include uses as reinforcement and thickening agents in various systems such as elastomers, resins and coatings. Consumer applications include cosmetics, pharmaceuticals, and direct and indirect food and feed additives. SAS products have been in global production for over sixty years. The chemical has been studied extensively by various international regulatory agencies and is considered to pose a low risk of adverse health effects to humans and the environment.

Chemical Identity

Pyrogenic silica (CAS # 112945-52-5) is a form of SAS that is created through a thermal process. Silica is also known as silicon dioxide (SiO_2). Silica is one of the most abundant substances in the earth's crust. Other forms of silica, including naturally-occurring amorphous silica and crystalline silica, share the same chemical composition and the same overall generic CAS # (7631-86-9). It is important to note, however, that amorphous and crystalline forms of silica differ significantly in their hazards to human health. The crystalline forms of silica (e.g., cristobalite, quartz) have been associated with lung diseases, such as silicosis. However, the amorphous forms of silica are not associated with these diseases and have a safe hazard profile.

Physical and Chemical Properties

CAB-O-SIL® Untreated Fumed Silica is a white, hydrophilic, inert, non-crystalline powder with a purity of greater than 99 percent by weight. CAB-O-SPERSE® Untreated Fumed Silica is a milky-white aqueous dispersion.

Uses

CAB-O-SIL® and CAB-O-SPERSE® Untreated Fumed Silica products are currently used in a wide variety of industrial and consumer applications. The main use of these pyrogenic silica products is as a reinforcement, thickening and flow agent in various systems. Industrial applications include use as reinforcing filler for many rubber and silicone products, such as footwear, conveyor belts, mats, seals, etc. Other industrial applications include use in polyester and epoxy resins to provide improved handling properties for these materials. Consumer applications include use in cosmetics, pharmaceuticals and foods. These products provide thickening in pastes and ointments to inhibit the separation of components and maintain flow properties in powder products. They also function as a carrier for fragrances and flavors.

Health Effects

Pyrogenic silica (a form of SAS) has not been associated with any significant health effects to workers or end users. A report by the European Centre for Ecotoxicology and Toxicology of Chemicals (ECETOC, 2006) concludes that in humans, SAS is essentially non-toxic by mouth, skin or eyes, and by inhalation. SAS has been manufactured for over six decades, and to date, there is no evidence of cancer or other long-term respiratory health effects (for example, silicosis) in workers employed in the manufacture of SAS. The International Agency for Research on Cancer (IARC) did not identify amorphous silica as either an animal or human carcinogen (IARC, 1997). The OECD SIDS Initial Assessment Report (OECD, 2004) concluded that SAS is "currently of low priority for further work" due to the low exposure potential for humans. The REACH chemical safety assessment (Dec. 2010) concluded that SAS in non-hazardous for all endpoints. SAS is therefore not classified under EU GHS (CLP Regulation 1272/2008/EC on classification, labelling and packaging of substances and mixtures). SAS is currently undertaking a substance evaluation by European Chemical Agency (ECHA)

Environmental Effects

Studies on SAS have shown that it has low toxicity to both aquatic and terrestrial organisms in the environment. The only exception is a desiccant effect that SAS has on insects exposed through direct contact; a property which has been used to create simple non-toxic insecticides. The OECD SIDS Initial Assessment Report (OECD, 2004) determined that SAS released into the environment is distributed mainly into soils and sediments, has no adverse biodegradability and is not bioaccumulative. The European Centre for Ecotoxicology and Toxicology of Chemicals (ECETOC, 2006) concludes that "SAS presents a low risk of adverse effects in the environment."

Exposure Potential

Potential exposure to pyrogenic silica could occur in both industrial and consumer settings. Workplace exposures are appropriately controlled with engineering controls and personal protective equipment. In its facilities globally, Cabot Corporation manages to the German workplace limit of 4 mg/m^3 (inhalable dust) (this value is the most stringent occupational exposure limit for the countries in which Cabot operates). The use of pyrogenic silica products in a wide variety of consumer products could potentially result in exposure to consumers. However, because of the low hazard, exposures to these products have not resulted in adverse health effects.

Risk Management

Risk is measured as a function of both hazard and exposure. If the hazard and/or exposure are low, the potential for risk is low. As discussed above, pyrogenic silica has low hazard for both humans and the environment. The potential for exposure exists because of the widespread use of products containing pyrogenic silica. However, despite the exposure potential, there have been no reported instances of adverse health effects. SAS has been studied extensively by various international regulatory agencies and is considered to pose a low risk to humans and the environment.

Cabot Corporation Contacts

We appreciate your interest in our CAB-O-SIL® and CAB-O-SPERSE® Untreated Fumed Silica products. If you need additional information, please feel free to contact Cabot's Product Support and Toxicology Group at (978) 663-3455.

References

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Disclaimer

This Product Stewardship Summary is intended to provide the general public with an overview of this chemical substance. It is not intended to provide emergency response, medical or treatment information. In-depth safety and health information can be found on the current Safety Data Sheet (SDS) for the product.

This information is being provided as of the date hereof. Please visit cabotcorp.com/certifications for any updates to this information.

NORTH AMERICA
Business & Technology Center
157 Concord Road
Billerica, MA 01821-7001
United States
T +1 978 663 3455

Customer Service:
T +1 678 297 1300

SOUTH AMERICA
Cabot Brasil Industria e Comercio Ltda.
Rua do Paraíso 148 - 5° andar
04103-000 São Paulo
Brazil

Customer Service:
T +55 11 2144 6429

EUROPE, MIDDLE EAST & AFRICA
SIA Cabot Latvia
101 Mukusalas Street
LV-1004 Riga
Latvia

Customer Service:
T +371 670 50 700

ASIA PACIFIC
Cabot China Ltd.
558 Shuangbai Road
Minghang District
Shanghai 201108
China

Customer Service:
T +86 21 5175 8800