

Silane Donors

LANXESS Solutions US Inc. is a global partner for the manufacturing, marketing and development of specialty organometallic products. These products are used in polymer production, the synthesis of fine chemicals and pharmaceuticals, and in processes for the fabrication of semiconductor devices and photovoltaic modules.

Identification

Product Trade Names:

- AXION[®] DX 5020
- AXION DP 5021
- AXION DX 5022
- AXION DD 5023
- AXION DC 5026

Chemical Names:

- Isobutylisopropyldimethoxysilane
- Diisopropyldimethoxy-silane
- Diisobutyldimethoxy-silane
- Dicyclopentyl-dimethoxysilane
- Cyclohexyl-dimethoxymethylsilane

Description

Silane donors are used as stereo-modifiers (stereo-regulators) in the production of polypropylene. They play an essential role in the polymerization reaction by increasing the isotacticity of the polypropylene. Furthermore, the use of silane donors in the polymerization process helps minimize undesired atactic resins. Some silane donors also act as catalyst additives for the manufacture of specific polyolefin grades with advanced Ziegler-Natta catalysts.

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Physical/Chemical Properties:

Correctly referred to as alkyl alkoxy silanes, LANXESS-produced silanes are comprised of two or more methoxy or ethoxy groups bonded to a silicon atom. Being external donors, they donate their extra electron to another molecule.

In normal, non-production conditions, silane donors have proven themselves to be stable. Nevertheless, these clear liquids are still dangerous, since they are flammable. Silane donors may only be handled by trained, appropriately-protected and equipped employees.

Health Effects:

Getting into contact with Silane Donors can irritate the skin and may cause sensitization by skin contact. The products can be harmful to the human body through inhalation and can cause risk of serious damage to the eyes.

LANXESS' silane donor products are sold only to industrial users. There are no known consumer uses for these substances, so it is very unlikely that consumers would be exposed to these products.

Potential Environmental Impact

The toxic intensity level varies from irritant to highly toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

Release Control and Disposal:

Spill and leak control measures are taken during both manufacturing and transportation. Silane donors have to be destroyed by combustion in compliance with all relevant regulations in a recognized hazardous waste incinerator. Packaging can be reused after cleaning. However, the washing solution has to be disposed in the same way as the product itself.

Product Stewardship:

LANXESS SOLUTIONS US INC. conducts a lifecycle analysis of existing products to evaluate potential risk areas throughout the products' life cycles. Elements evaluated include raw materials, manufacturing, transportation, customer end use and disposal. New products are evaluated, using environmental, health and safety (EHS) criteria. Additionally, before changes in existing product formulations are made, a detailed

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evaluation is made of the proposed change. A critical component of all of these processes is the Safety Data Sheet, which lists product hazard information.

Potential product risks that are identified are reviewed according to current controls. In the context of a continually improving risk-reduction program, periodic reviews of current controls occur in order to identify opportunities for improvements or enhancements. Each product family is the responsibility of a designated product steward, who serves as the champion for continuous improvement through the risk evaluation and reduction process.

Customers and the public are advised, however, that the hazard information for a product is only one of several factors that can affect the potential risks presented by that product in any particular use and application. In using our products, customers should follow proper use instructions and ensure that proper personal protective equipment is used. These are critical components in reducing the potential risks of any product.

Regulatory Compliance:

The Occupational Safety and Health Administration (OSHA) in the U.S., as well as various regulatory bodies in the EU, regulate the limits of exposure in the workplace according to the limits published. Various regulatory bodies such as the U.S. Department of Transportation and the International Maritime Organization classify Silane Donors for transport as flammable liquids. The international shipping is controlled by the United Nations Transport of Dangerous Goods Code. The use and disposal of silane donors is covered in the U.S. by the Toxic Substances Control Act (TSCA) and in Europe by the REACH regulation.

Manufacturing and Processing:

Production takes place in closed systems. These production units are regularly inspected by third-party inspectors certified by regulatory authorities. Silane donors are produced by a variety of methods and chemical processes. LANXESS SOLUTIONS US INC. has more than 25 years of experience in synthesizing and handling these compounds. The LANXESS silane donor product portfolio is manufactured at our facility in Bergkamen, Germany.

Transportation:

Specialized containers of various capacities from one to approximately 17,000 kg (depending on the specific product), as well as standard drums of various sizes, are used for the safe transportation of silane donors. Laboratory use quantities are packaged and shipped in smaller, coated glass bottles. All containers comply with applicable transportation regulations.

Exposure Potential:

All processes, including manufacturing, transportation, disposal and emissions are controlled by state authorities and regulations. Consumers are not likely to be exposed through normal distribution and use.

Operators working with silane donors must complete special training in the skills necessary to safely handle silane donor compounds. While using these products, plant workers must wear protective, fire-resistant full-body suits that allow sufficient freedom of movement and are also light and easy to shed in case of a spill onto clothing. Additional personal protective equipment includes safety helmets with face shields, protective gauntlets and goggles.

Conclusion

The products which were produced using silane donor compounds are an integral part of daily life. While the silane donors are essentially not present in the final application, they are essential to enable us to live as comfortable, safe and future-oriented as possible

Contact Information

For more information, please contact us by our web site: <http://www.LANXESS.com>

Notices

Use and Application Information

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent.