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PRODUCT STEWARDSHIP SUMMARY

CAS No. various
FORMULA No. various

Brominated Fire Safety Solutions

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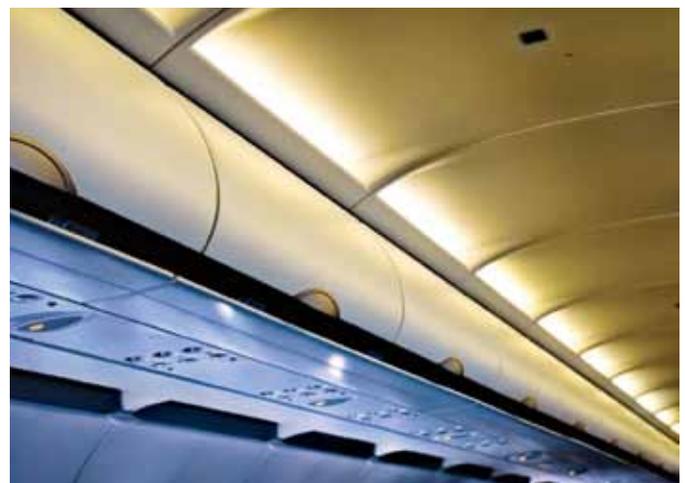
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Introduction

Brominated fire safety solutions play a significant role in making homes, hotels, hospitals, nursing homes, offices, automobiles, and public transportation safer. They have helped save countless lives by preventing fires from starting or by slowing down the progress of fires that do start. They delay the spread of a fire and can lengthen the time to flashover, and, in doing so, give people more time to escape the effects of the fires. The ultimate purpose of their use is to save lives, reduce injury, reduce destruction of property, and reduce local pollutants that result from fires. It is important that these products be used in a manner that adequately addresses environmental or health concerns, so that the life safety benefits of these products are maintained, without damage to the environment.

Description and Properties

Brominated fire safety solutions are a class of compounds that contain bromine and that either alone, or in combination with other substances, render plastics and textiles more resistant to ignition. Brominated fire safety solutions can be either additive or reactive. Additive means that they are blended and encapsulated into plastics with all the plastic's other components during processing. Reactive means that



they are chemically reacted with other materials in the plastic. A reactive fire safety solution does not exist in its original form in the plastic, whereas an

additive does. While many brominated fire safety solutions are solid powders, some are liquids, or sold as pellets or granules. The major brominated fire safety solutions in use have undergone extensive testing to support their safe and continued use.

Uses

The important safety role that brominated fire safety solutions play in many of the products we use on a daily basis is generally unrecognized. Brominated fire safety solutions are essential to meet flammability standards for a wide variety of everyday products, such as electronic equipment, upholstered furniture and other furnishings in high risk areas, building insulation, automobiles, aircraft, and other products. The heat and electricity experienced by electronic equipment drives the use of highly effective brominated fire safety solutions. Similarly, brominated fire safety solutions are used in airplane and automobile interiors and behind the panels/under-the-hood areas where a high degree of protection from fire is needed.

Health Information, Exposure Potential, and Environmental Information

Consumer exposure is unlikely to occur. Brominated fire safety solutions are present in low levels and bound within plastics. Any migration would occur slowly at diminishing levels. The safety of these fire safety solutions is supported by a long history of safe use in products found in homes and offices.

Exposure can occur in either facilities that manufacture brominated fire safety solutions or facilities that use them for the manufacture of other products. Engineering controls and use of appropriate protective equipment minimize the potential for worker exposure. Good housekeeping and control of dusts in the manufacturing process are necessary for safe handling of the product.

Brominated fire safety solutions are not sold directly to the public for general consumer uses. After formulating with

plastic, the lack of migration prevents exposure through consumer products.

In workplaces using these products, workers should always use eye protection, such as chemical goggles or safety glasses. Chemical resistant gloves, protective clothing, and adequate ventilation should be used to prevent exposure. For additional helpful



information, please consult the relevant Albemarle Material Safety Data Sheet at <http://www.albemarle.com/Products-and-Markets/MSDS-20.html>.

Brominated fire safety solutions are designed to be bound within the plastic in consumer products, so there are no anticipated environmental impacts. They are specifically designed to not break down except in the case of fire, therefore, they are very stable compounds. Extensive toxicological testing has not shown any adverse effects to human health. Even so, precautions should still be taken in industrial workplaces to prevent human exposures or environmental releases.

Despite their lack of impact on the environment, Albemarle partners with customers using brominated fire safety solutions to participate in the Voluntary Emissions Control Action Program

Product Name	Chemical Names	Applications
SAYTEX® 8010	Ethylene 1,2-bis(pentabromophenyl)	Plastic cases and wires used in various electronics
SAYTEX® BT-93 SAYTEX® BT-93W	Ethylene bis(tetrabromophthalimide) 1,2-bis(tetrabromophthalimido) ethane	Plastic lamp sockets and office appliances
SAYTEX® CP-2000	Tetrabromobisphenol A	Printed wiring board laminates
SAYTEX® HP-900	Hexabromocyclododecane	Polystyrene insulation boards
SAYTEX® HP-3010	Brominated Polystyrene*	Connectors
SAYTEX® HP-7010	Brominated Polystyrene*	Connectors
SAYTEX® RB-79	Diol of Tetrabromophthalic acid Tetrabromophthalate diol	Polyurethane foam

(VECAP) by practicing the best available techniques to prevent products not bound within plastic from reaching the environment during manufacturing processes. More information about VECAP can be found at <http://www.vecap.info/>



Physical Hazards

The brominated fire safety solutions discussed above have no practical physical hazards. For extreme conditions please consult the the relevant Albemarle Material Safety Data Sheet at <http://www.albemarle.com/Products-and-Markets/MSDS-20.html>

Derivation/Manufacturing

Various types of brominated fire safety solutions are manufactured worldwide using different methods and chemical processes. Albemarle produces brominated fire safety solutions in our US facilities in Arkansas, South Carolina, and Louisiana; as well as in Jordan.

Regulatory Information

Brominated fire safety solutions generally do not present a fire, explosive or reactivity hazard. In the United States, all commercial brominated fire safety solutions produced by Albemarle

Corporation are in compliance with the Toxic Substances Control Act (15 USC 2601-2629).

In the U.S. the brominated flame retardants are not regulated by DOT for ground transportation. Saytex CP-2000 and Saytex HP-900 are

classified as Class 9, Environmentally Hazardous Substances, when shipped by ocean or air.

The REACH Regulation (Registration, Evaluation, Authorization and Restriction of

Chemical substances) is a new European regulation on chemicals and their safe use (Regulation EC No 1907/2006). It includes registration, evaluation, authorization, and possible restriction of all chemicals sold or used in the European Union. Pre-registration of commercially available Albemarle Corporation products has already taken place, with registration expected.

Product Stewardship

Albemarle is committed to responsible manufacturing and handling. Our goal is to produce brominated fire safety solutions safely. Our relationships with our customers

encourage communication about safety and environmental stewardship, and we work with them to minimize the risks of personnel exposure and spills for all of our products.

A Voluntary Emissions Control Action Program (VECAP) has been initiated for brominated fire safety solutions with the goal to reduce emissions of fire safety solutions to the environment. The aim of VECAP is to manage, monitor, and minimize industrial emissions of brominated fire safety solutions into the environment, both by producers and users. VECAP is a program in which manufacturers and users of brominated fire safety solutions work together to establish and share “best practices” on the handling of these materials. The ultimate goal is to prevent or eliminate emissions to the environment in a sustainable and measurable manner, both from manufacturing facilities and from all end user sites throughout the supply chain.

Albemarle Corporation is committed to reducing emissions of brominated fire safety solutions at our manufacturing sites, as well as working closely with our customers to use VECAP in order to





as the Voluntary Emissions Control Action Program, will help to keep these materials out of the environment, while allowing continued use of products with life safety benefits.

Note

This document provides general information about brominated fire safety solutions and does not supplant or replace required regulatory and/or legal communication documents, nor is it intended to provide an in-depth discussion of health and safety information. Always consult the product's material safety data sheet, product label and technical data sheet before using the chemical.

reduce their emissions of brominated fire safety solutions to the environment.

Conclusion

Brominated fire safety solutions are valuable materials that have saved lives, reduced injury, reduced destruction of property, and reduced local pollutants that result from fires. These materials have played a significant role in making homes, hotels, hospitals, nursing homes, offices, automobiles, and public transportation safer. The major brominated fire safety solutions have undergone extensive testing to support their safe and continued use. Excellent product stewardship, such

References

REACH - http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm

Various Material Safety Data Sheets
Albemarle Corporation

Voluntary Emissions Control Action Program - www.VECAP.info

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Albemarle Corporation is a member of the American Chemistry Council and, through ACC's participation with the International Council of Chemical Associations (ICCA), has prepared this document to improve product stewardship within the chemical industry and with suppliers and customers.

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