

Emerald Innovation® 3000

Butadiene styrene brominated copolymer is a product that is added to extruded polystyrene (XPS) or expanded polystyrene (EPS) to reduce their respective inherent flammability characteristics. Butadiene styrene brominated copolymer is marketed by LANXESS Solutions US Inc. under the trade name Emerald Innovation® 3000. Emerald Innovation 3000 is a compacted solid, and its effectiveness as a flame retardant is based upon bromine chemistry. Emerald Innovation 3000 is used because it can either slow the ignition of polystyrene it is embedded within, or, if ignition does occur, it can slow the spread of fire and allow more escape and response time. Polymeric flame retardants such as Emerald Innovation 3000 exhibit characteristics of polymers which ultimately enhance their safety in manufacture and use. Their repeating monomer units, larger molecular weights and inability to readily dissolve in water makes them inherently less likely to have a detrimental effect on human health or the environment.

Identification

The product that is addressed through this product safety assessment is Emerald Innovation 3000. Identifiers for this materials include:

- Emerald Innovation 3000
- Butadiene styrene brominated copolymer
- CAS No. 1195978-93-8

Description

Production:

Emerald Innovation 3000 is produced in a dedicated manufacturing unit designed for the manufacture of chemicals. The resulting reaction product is further refined to meet specifications and then packaged in bulk, semi-bulk and smaller packages for distribution to customers that use it to flame retard their polystyrene products.

Uses:

Emerald Innovation 3000 is a polymeric flame retardant that is added to extruded polystyrene (XPS) or expanded polystyrene (EPS) to reduce the end product's inherent flammability characteristics. Polystyrene is constructed using petroleum products and consequently can be highly flammable if left unmodified. After the XPS or EPS products are modified through the addition of Emerald Innovation® 3000, the final products are less likely to ignite, and if ignition does occur, the fire will spread more slowly than if the polystyrene was left unmodified.

Properties:

Appearance:	White Powder
Softening Point:	64 °C
Water Solubility:	Insoluble

Potential Human Health Effects

Health Effects:

Emerald Innovation 3000 is safe to use in industrial settings equipped with suitable engineering controls, when appropriate personal protective equipment is worn and when proper hygiene measures are followed after use. Emerald Innovation 3000 is not sold directly to consumers and there is low likelihood of exposure to the substance in the applications where it is used.

High level exposure to Emerald Innovation 3000 is unlikely to occur under normal working conditions. In the unlikely event that high level exposure does occur, it is notable that Emerald Innovation 3000 does not represent an acute hazard, and workers subjected to high levels of this chemical are not expected to be harmed.

The product form of Emerald Innovation 3000 is a compacted solid. Consequently, the most likely exposure scenario for Emerald Innovation 3000 is due to dust that could form while the bags are being discharged in an industrial setting. Dust that is inhaled could irritate the respiratory system if poor ventilation is employed or protective equipment is not worn and the dust is inhaled.

Just as with aspirin, water, alcohol, bathroom cleaner and other commonly used chemicals and materials, Emerald Innovation 3000 does have an inherently very low level of toxicity that must be understood and safeguarded against through the use of engineering controls, personal protective equipment and through

appropriate procedures. However, it is worth noting that due to its significant polymeric characteristics, the hazards and corresponding risks associated with this flame retardant make it a preferred product when handling in an industrial setting from a health management perspective. The safety data sheet is the best resource to consult for understanding the health hazard risks associated with this polymeric flame retardant.

Emerald Innovation® 3000 is part a premix formulation when used for polystyrene. The premix formulation is sometimes further prepared, but then the polymeric product is cured as part of a manufacturing process and embedded into the polystyrene.

No known negative health effects exist for users of polystyrene that are made when Emerald Innovation 3000 is incorporated into the end-product.

Industrial Use:

Emerald Innovation® 3000 is used to manufacture polystyrene based products. It is used in well-controlled manufacturing facilities by people trained in the hazards of polymer additives and chemicals. Emerald Innovation 3000 used in a manufacturing setting is handled using best practice techniques developed to minimize any potential risk of exposure to liquids, vapors or solids. Use sites utilize engineered systems to minimize the potential for exposure to all the chemicals used in the process. Unplanned releases or spills of Emerald Innovation 3000 are not expected to represent a life-threatening situation due to their polymeric chemical characteristics. In any spill or release incident, all non-essential personnel are immediately evacuated upwind of the spilled material. All personnel involved with correcting a spill situation are trained and properly equipped with the required personal protective equipment.

Consumer Use:

It is very unlikely that consumers would be exposed to Emerald Innovation 3000 in its concentrated form, because it is only sold for industrial use to be embedded into polystyrene products and is not itself a consumer product. There is no known data that indicates the possibility that Emerald Innovation 3000 could leach out of polystyrene products in a manner that represents a significant risk for consumers.

Environmental Release:

When used in an industrial setting, Emerald Innovation 3000 is handled using engineered systems designed to minimize any release to the environment.

Emerald Innovation 3000 that is released to the environment will collect on hard surfaces and potentially mix with soil or other porous materials. Contained quantities of Emerald Innovation 3000 can be collected in plastic or metal drums. Soils exposed to Emerald Innovation 3000 should be exhumed and treated.

Physical Hazards

Emerald Innovation 3000 is a compacted white solid, and its effectiveness as a flame retardant is based upon bromine chemistry. Because this product is an organic powdered solid, it is possible for it to form combustible dust in air.

Potential Environmental Impact

Environmental Fate Information:

Polymeric flame retardants such as Emerald Innovation 3000 must exhibit a minimum level of stability to perform in their intended applications. However, when released to the environment, this stability will make it likely that they will be slow to break down and persist in the environment. Consequently, managing emissions while manufacturing with polymerics is a recommended practice.

Emerald Innovation 3000 that has been embedded into a polymer matrix is unlikely to leach or migrate under normal use conditions due to its large molecular size.

Aquatic and/or Terrestrial Toxicity:

Releases of Emerald Innovation 3000 to the aquatic or terrestrial environment should be avoided. Consult the materials safety data sheet for specific information on the product of interest.

Soils containing Emerald Innovation 3000 should be remediated to remove the chemical completely.

Product Stewardship

Manufacturing locations:

Facility management procedures, safety data sheets, technical guidance documents, and training are available to communicate safe handling, risk mitigation measures and emergency response information requirements to employees at manufacturing locations.

Environment:

Managing emissions during manufacture is the focus of a product stewardship program called VECAP introduced and managed by the major flame retardant manufacturers. VECAP is an acronym for Voluntary Emissions Control Action Program and is an initiative by industry to partner with the supply chain to understand, control and reduce the emissions of flammability modifiers to the environment.

Consumers:

Consumers are not usually exposed to Emerald Innovation 3000 distributed by LANXESS Solutions US Inc., because we do not sell them directly to consumers nor endorse sales to consumer markets. Emerald Innovation 3000 is among the many chemical materials that are commonly shipped to industrial manufacturing locations. Consequently, there exists the potential for the general public to be exposed to Emerald Innovation 3000 during a transport accident. Precautions are taken throughout transport to ensure the container movements are well controlled and the risk to the public is minimized.

LANXESS Solutions US Inc. conducts an ongoing analysis of its products to evaluate potential risk areas throughout the product's life cycle. Chemical risks are identified at the very early stage of new product development. They are evaluated by stage-gated reviews using environmental, health, and safety (EHS) criteria. The analysis of existing products will evaluate raw materials, manufacturing, transportation, customer end-use and disposal. Additionally, before changes in existing product formulations are made, a detailed evaluation is made of the proposed change. A critical component of all of these processes is the safety data sheet, which lists detailed product hazard information.

In the context of a continually improving risk-reduction program, LANXESS Solutions US Inc. conducts periodic reviews of current controls in order to identify opportunities for improvements or enhancements to the handling of our products. This includes adaptation of existing procedures to changes in regulations (e.g., covering workplace and transportation).

Conclusion

Emerald Innovation 3000 is a polymeric chemical that is embedded into a polymer matrix with a unique ability to change the flammability characteristics of polystyrene. Though there are potential minor hazards associated with Emerald Innovation® 3000, it is only handled by highly trained people in manufacturing environments utilizing specialty equipment, safety controls and personal protective equipment.

Contact Information

LANXESS Solutions US Inc. Business

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.