Firemaster® 600

Firemaster® 600 flame retardant is made from a mixture of brominated and phosphorus-based substances that significantly reduce the combustibility of flexible polyurethane (PU) foam. Firemaster 600 flame retardant is added to the foam formulation as a raw material during the foam manufacturing process. It contains the chemicals tetrabromobenzoate, tetrabromophthalate, *tert*-butylated triphenyl phosphate and triphenyl phosphate. The resulting flame retardant mixture provides performance characteristics superior to those that the individual flame retardant substances would provide for PU foam on their own. The chemicals that go into the production of Firemaster 600 flame retardant have been registered with appropriate regulatory agencies who have approved them for their intended use in flexible PU foam for furniture and other similar products.

Identification

Firemaster 600 flame retardant is a mixture of substances. The primary constituents are:

- tert-butylated triphenyl phosphate (CAS 68937-40-6), tbTPP
- triphenyl phosphate (CAS 115-86-6), TPP
- 1,3-Isobenofurandione, 4,5,6,7-tetrabromo-, reaction products with 2-ethyl-1-hexanol (CAS 219632-53-8)

The reaction product mixture listed above (CAS 219632-53-8) is referenced as two components in certain jurisdictions, 1) tetrabromobenzoate (CAS 183658-27-7), TBB and 2) tetrabromophthalate (CAS 26040-51-7), TBPH.

Description

Production:

The reaction product mixtures and substances used to make Firemaster 600 flame retardant are produced in dedicated manufacturing units. During production, the raw materials are combined in separate chemical production units designed for the manufacture of chemicals. The respective resulting reaction mixtures and individual substances are combined to formulate Firemaster 600 flame retardant. Firemaster 600 is then packaged in bulk, semi-bulk and smaller packages for distribution to manufacturers that use it in their foam products.

Uses:

Firemaster 600 flame retardant is designed for use in flexible PU foam for upholstered furniture. PU foam is highly flammable, unless a flame retardant is incorporated into the product during manufacturing. When evaluated using standard test protocols, foam containing Firemaster 600 flame retardant takes longer to ignite and, if ignited, longer to become fully engulfed by flames versus untreated PU foam. Unlike many other potential flame-retarding chemicals, Firemaster 600 flame retardant effectively retards flames while minimally impacting foam color, cell structure, firmness, comfort and other qualities that are important to furniture manufacturers and consumers.

Properties:	Appearance:	Clear amber liquid
	Viscosity (20 °C):	322 cps
	Water Solubility:	<0.1 g/ 100 g

Potential Human Health Effects

Health Effects:

Firemaster 600 flame retardant is safe to use in industrial settings equipped with suitable engineering controls when appropriate personal protective equipment is worn and proper hygiene measures are applied. Consumers are not at risk of harm to exposure from Firemaster 600 in end-use consumer products.

Excessive exposure to the substances used to make Firemaster 600 flame retardant is unlikely to occur under normal working conditions. In the unlikely event that a worker is subjected to excessive dermal or vapor exposures of the substances used to make Firemaster 600 flame retardant for a substantial length of time, adverse effects could result.

When mixed into polyurethane, which is then reacted to produce comfort foam, Firemaster 600 flame retardant becomes part of the polymer matrix of the foam, making direct exposure much less likely. Further, in most furniture applications, foam is also covered by fabric and additional barriers that make intimate contact with the foam unlikely. In any event, mere contact with the foam is not sufficient to produce adverse health effects.

Industrial Use:

Firemaster 600 flame retardant is used primarily to make flexible PU foam products that are used in the manufacture of furniture. It is only sold for use in highly controlled manufacturing facilities employing people trained in the handling of chemicals. Firemaster 600 flame retardant used in a manufacturing setting should be handled using best practice techniques developed to minimize any potential risk of exposure to liquids and vapors. Sites utilize highly-engineered systems to minimize the potential for exposure to all the chemicals used in the process. Unplanned releases or spills of Firemaster 600 flame retardant are not likely to represent a life-threatening situation. In any spill or release incident, all non-essential personnel should be 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 Firemaster 600 flame retardant in its concentrated form, because it is only sold for industrial use to make foam products and is not a consumer product.

Environmental Release:

When used for foam production, Firemaster 600 flame retardant is handled using highly engineered systems designed to minimize any release into the environment. Firemaster 600 flame retardant is distributed to industrial locations using protocols designed to minimize the risk of emissions into the environment.

Firemaster 600 flame retardant that is accidentally released into the environment will pool on hard surfaces and soak into soil or other porous materials. Contained volumes of liquid Firemaster 600 flame retardant can be collected in plastic or metal drums. Soils wetted with Firemaster 600 flame retardant should be collected and treated or disposed of appropriately.

Physical Hazards

Firemaster 600 flame retardant is a clear, amber-colored viscous liquid. As a liquid, it is easily added and blended into foam formulations. Firemaster 600 flame retardant is thermally stable, which allows it to withstand the heat that is generated during the manufacture of foam and also ensures it will provide desired fire protection during the life of the foam product.

Potential Environmental Impact

Environmental Fate Information:

Some components of Firemaster 600 flame retardant are considered to be potentially persistent, bio-accumulating and toxic; therefore, releases into the environment should be avoided.

Aquatic and/or Terrestrial Toxicity:

Releases of Firemaster 600 flame retardant into the aquatic or terrestrial environment should be avoided. Large concentrations of Firemaster 600 flame retardant released in an aquatic environment could adversely affect fish and other aquatic life. Soils contaminated by Firemaster 600 flame retardant spills should be collected and treated or disposed of appropriately.

Product Stewardship

Manufacturing locations:

Facility management procedures, Safety Data Sheets (SDS), technical guidance documents and training are available to communicate safe handling, risk mitigation measures and emergency response requirements to employees at manufacturing locations.

Environment:

A special system for the distribution of Firemaster 600 flame retardant to major customers was designed to specifically reduce the risk of environmental impact. The system includes the use of dedicated trucks and specialized tank cleaning only when necessary to minimize the potential for release of the product to the environment.

Consumers:

Prior to commercial production and use, the key component of Firemaster 600 flame retardant was assessed by the U.S. Environmental Protection Agency (EPA), because it had never been made or sold in the U.S. At the conclusion of this thorough assessment process, the EPA approved the component for its intended purpose (flame retarding PU foam for use in furniture products). Consumers do not handle Firemaster 600 flame retardant distributed by LANXESS Solutions US Inc., because it is an industrial product that is not sold directly to consumers.

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 products. They are evaluated by stage-gated reviews using environmental, health and safety criteria. The analysis of existing products evaluates 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 SDS, which lists detailed product hazard information.

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. This includes modify existing procedures to conform with changes in regulations (e.g., covering workplace and transportation).

Conclusion

Firemaster 600 flame retardant is a chemical mixture with a unique ability to reduce the flammability of flexible PU foam in a manner that maintains important foam performance characteristics. Though there are potential hazards associated with the material, it is only handled by highly-trained people in manufacturing environments utilizing specialty equipment, safety controls and personal protective equipment. The product has been assessed by LANXESS Solutions US Inc. and the U.S. government regulators, who agreed that it is safe for use in its intended application.

Contact Information

LANXESS Solutions US Inc.
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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.