1298 Cronson Blvd., Suite 201
Crofton, MD 21114
(800) 607-3772
www.epsmolders.org

HBCD Use & Application in EPS Foam Insulation

Safety First

Flame retardants play a crucial role in making homes, hospitals, schools and other buildings safer from the life-threatening consequences of fire. In 2007, U.S. fire departments responded to 1,557,500 fires involving 531,108 building structures. Total fire related deaths were 3,430, with an additional $15 billion in property damage.[1]

In order to reduce the risk of fires and provide adequate time to vacate a building in case of fire, governments, product manufacturers and professional associations have promoted the use of flame retardants in products and building materials likely to burn. This is particularly true for polymeric materials. Flame retardants are used in a variety of commercial products to protect people and property from potential fire hazards by accomplishing one or more of the following functions:

- Raise the ignition temperature of the polymer;
- Reduce the rate of burning;
- Reduce flame spread; or
- Reduce smoke generation.

HBCD Fire Resistance

The flame retardant used in EPS foam insulation is HBCD. Hexabromocyclododecane (HBCD) is an additive flame retardant bound to the polymer that promotes increased fire resistance in building and construction applications, allowing EPS to meet stringent fire safety requirements as determined by the International Code Council and National Building Code of Canada. It offers unique performance in polystyrene foams because it is effective at low levels (around 0.7% in EPS), enabling fire safety to be ensured without loss of thermal insulation quality.

HBCD Risk Assessment

HBCD has undergone a thorough scientific assessment to identify potential risks for human health and the environment. Research shows that HBCD is degradable and therefore does not meet the criteria as a persistent substance. HBCD distribution in the environment is largely confined to sediments near point sources and is unlikely to be toxic in sediment-dwelling species. Where it was found, the levels were low and not at a level likely to present a toxicological risk to wildlife.[2]

It is also proven that leaching of HBCD from polystyrene foam insulation is insignificant. Under forced laboratory conditions to measure the release of HBCD from polystyrene foam, results indicate that only 0.05% or less leached out of the foam within a four week period at which stage the leaching ceased altogether.[3,4]

The majority of HBCD emissions are related to its use in textiles, where it may not be bonded to the material. A risk assessment completed by KEMI shows that the textile industry is responsible for 86% of the HBCD emissions to the overall environment, and 92% of HBCD emissions in water.[5]

Search for HBCD Alternatives

Currently there is no technically suitable or commercially available alternative to brominated flame retardants for use in EPS. Although the industry has been actively engaged in research and development to find an alternative, a

viable solution has not been identified. Manufacturers have recognized certain requirements that should be met before HBCD substitutions can be identified and implemented:

- Provide equal or better flame retardance;
- Result in equal or better performance and physical properties;
- Pose less risk to the environment and human health;
- Offer compatibility with existing manufacturing processes; and
- Are commercially available.

BFR Industry Actions

Despite the extensive scientific data showing HBCD use in EPS poses minimal risk, government agencies maintain that it merits ongoing review. The brominated flame retardant industry is working closely with these agencies in North America and Europe to conduct further environmental testing and has introduced voluntary emissions reduction programs to further reduce emissions of HBCD to the environment.

Meeting Future Energy Reduction Goals

Improving energy efficiency in buildings to reduce greenhouse gas emissions and save fossil fuels is a global priority today. EPS and XPS foam insulations are essential to achieve energy reduction in building renovations and new construction, offering short payback times and easy installation to quickly improve the thermal envelope of commercial and residential structures. Two of the most efficient housing options, Insulated Concrete Forms (ICF's) and Structurally Insulated Panels (SIPs) rely almost entirely on EPS for their systems.

In addition to their insulating properties, XPS and EPS can function as a moisture barrier, protect against damage from freeze-thaw cycling and provide structural stability in construction and infrastructure applications. Traditional non-rigid insulation materials typically have much lower R-values and therefore may not be suitable for applications where high R-value is a critical concern. To meet current market demand for high performance building materials, fast construction and design flexibility, architects and builders need a wide range of insulation solutions that will enable them to meet future energy code requirements.

HBCD Status in Canada

HBCD is not a listed chemical by Environment Canada although it is currently undergoing review.

HBCD Status in U.S.

HBCD is not a listed chemical for the U.S. Toxics Release Inventory (TRI) program.

---

[1] U.S. Fire Administration National Fire Statistics, 2007

[2] 'Sediment Record and Atmospheric Deposition of Brominated Flame Retardants and Organochlorine Compounds In Lake Thun', C. Bagdad et al, Journal of Environmental Science & Technology, Oct 2008

[3] 'Leaching of Hexabromocyclododecane From Expanded Polystyrene Under Acidic Conditions', Association of Plastics Manufacturers of Europe, Dec 1996

[4] 'Environmental Waste Classification of EPS and XPS Foam Boards Containing Hexabromocyclododecane as Flame Retardant', CEFIC, Feb 2009

[5] 'Survey and Technical Assessment of Alternatives to TBBPA and HBCDD', KEMI Swedish Chemicals Agency, Jan 2006