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SIPs and HBCD Flame Retardants

The flame retardant used in EPS and XPS foam insulation is Hexabromocyclododecane (HBCD). HBCD is an additive flame retardant that promotes increased fire resistance in building and construction applications, allowing EPS to meet stringent fire safety requirements outlined in the building codes dictated 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 0.5% by weight in EPS), enabling fire safety to be ensured without any loss of thermal insulation quality.

HBCD Risk Assessment

HBCD has undergone a thorough scientific assessment to identify potential risks to human health and the environment. Research shows that HBCD is degradable and therefore does not meet the criteria as a persistent substance when tested at environmentally relevant concentrations.[1] 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% (500 parts per million) or less leached out of the foam within a four week period, at which stage the leaching ceased altogether.[3,4] It is noteworthy that these forced conditions are more severe than installed insulation products would be subjected to in normal building applications.

The majority of HBCD emissions are related to its use in textiles. A risk assessment completed by the Swedish Chemicals Agency (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.

Industry Actions

Although extensive scientific data shows that HBCD use in foam insulation poses minimal risk, government agencies maintain that it merits ongoing review. The flame retardant industry is working closely with the appropriate 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.

Search for HBCD Alternatives

Currently there is no commercially available alternative to HBCD for use in foam insulation. 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;
- Maintain cost effectiveness; and
- Offer compatibility with existing manufacturing processes.

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HBCD Status in Canada

HBCD is not a listed chemical by Environment Canada although it is currently one of many chemicals undergoing review.

HBCD Status in U.S.

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

References

1. *Risk Assessment Report on Hexabromocyclododecane (HBCD) Environmental Part CAS No.: 25637-99-4, EINECS No.: 247-148-4*, Scientific Committee on Health & Environmental Risks (SCHER), Jan 2008

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 in Europe, Dec 1996

4. *Environmental Waste Classification of EPS and XPS Foam Boards Containing Hexabromocyclododecane as Flame Retardant*, CEFIC, Feb 2009

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