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Halogenated Flame Retardants
&
Foams found in buildings

Council of Experts White Paper
March 28, 2013

Summary:
Polystyrene, polyisocyanurate, polyurethane and similar foams have found wide application as building insulation and in furniture. In the case of insulation, these high R-value materials permit highly energy efficient buildings, significantly reducing energy costs, greenhouse gas emissions and other environmental impacts associated with energy production. However, these foams will burn, and exposed foam plastic insulation was associated with building fires in the 1970s. This led to the introduction of various chemical flame retardants into foams as a means of reducing fire risks.

Halogenated Flame Retardants (HFR) are commonly used as flame retardants in a variety of foams used in buildings – both insulating foams and foams used in furnishings. More recently it has become apparent that HFRs pose serious health and environmental risks, outweighing the potential benefits as a universal flame retardant. In many cases the HFR is added so that the foam passes a code-mandated test. However, the test protocols do not accurately predict actual performance in a building fire. Alternative solutions provide a better level of fire resistance. In the case of furnishings, this means using flame retardant or fire resistant covering materials; in the case of building insulations this means covering the foam with commonly used thermally resistant finishes such as sheetrock. Changing regulations so that HFRs are not universally required in foam building products removes health risks from widespread HFR use and exposure.

Discussion:
Research on the risks and benefits of widespread HRF use is voluminous.
For literature on furnishing foams, see the support documentation for California's proposed TB117-2013 regulation (http://www.bhfti.ca.gov/about/laws/propregs.shtml)
For literature on building insulation, Babrauskas, V., Lucas, D., Eisenberg, D., Singla, V., Dedeo, M., & Blum, A. (2012). Flame retardants in building insulation: a case for re-evaluating building codes. Building Research & Information. doi:10.1080/09613218.2012.744533) is an excellent and recent summary of the research, with comprehensive references.
In addition, the Green Science Policy Institute has a good collection of FAQ's, presentations and publications (http://www.greensciencepolicy.org/publications)

These references clearly support the argument against Halogenated Flame Retardants (HFR) in foams – be they for insulation or furnishings.

First, the HFRs pose a variety of hazards:

1) HFRs have well documented adverse environmental and health impacts.
   a) They are biopersistent and bioaccumulative; they show neurological and developmental toxicity, endocrine disruptive behavior, and potential carcinogenicity.
   b) Their distribution is global – indicating that they are not adequately contained during the life cycle, but escape into the environment.

2) In the event of fire, the HFRs are associated with toxic volatiles that may otherwise not exist in the smoke, or that may be present in higher concentrations, increasing risk to occupants and firefighters.

3) The presence of the HFRs in furniture exposes vulnerable populations – especially young children – to HFRs, primarily through dusts created from the foams. HFRs used in insulating foams are commonly found in human fluid samples as well. Human exposure to HFRs is well documented.

4) End of life disposal, recycling and reuse options for foams do not adequately control HFR releases or exposure. Controls on recycled materials appear inadequate to prevent broad exposure to HFR containing dusts; disposal in municipal waste or construction and demolition (C&D) landfills does not control leakage of HFRs to the environment.

Second, the HFRs do not adequately protect the foams from burning.
1) In the case of furnishings, providing a flame resistant covering provides much greater resistance to likely ignition sources. Foams that contain HFRs will still ignite and burn, making a flame resistant covering essential. Tests also show that the flame resistant covering offers adequate protection from ignition to foams without added HFRs.

2) In the case of building insulation, the thermally resistant finishes currently in use (sheetrock) provide more than adequate fire resistance, rendering the addition of HFRs unnecessary. Since insulating foams with HFRs still should be, and normally are, encased by a thermally resistant finish, HFRs offer few if any benefits. Conventional insulating foams, HFR or not, require an appropriate thermal resistant finish to perform well in a fire.

Conclusion:
Use of HFRs do not demonstrably improve real-world fire resistance, yet increase health risks, and, by adding complexity and materials, increase product costs. While the inclusion of HFRs in building and furniture foams seemed like a good idea when first implemented over 30 years ago, current research on both toxicology and fire performance show that the associated risks outweigh any marginal benefits.

Changing regulatory requirements so that HFRs are not required when alternative solutions provide the appropriate levels of safety is good for consumers, good for firefighters, good for manufacturers, and good for the environment.