

A PROJECT TO IMPROVE FOAM PLASTIC INSULATION CODES

Fire safety without harm Safer Insulation Solution



GET INVOLVED

*Involved in energy efficiency?
Green building? Care about
health? Do you live, work, design
or build with foam insulation?*

*You want what we're working
towards - energy efficient, non-
toxic buildings that are fire safe.*

Join the *Safer Insulation Solution's* effort to open the door to allow flame retardant free foams to be used where it makes sense. With your support, we can change the future.

Join as we work towards change in the 2015 ICC code development process.

Our overall goal is to reduce the use of harmful and potentially harmful chemicals in building insulation while maintaining fire safety. As we continue to reduce our carbon footprint using foam plastic insulations, it is critical to update codes so that energy efficient buildings will be fire-safe and healthy for fire service professionals, occupants, the community and environment.

SUPPORT THIS EFFORT

- Donate on the SIS site:
www.saferinsulation.org
- Sign the *Resolution* on the SIS site
- Write a letter of support
- Educate others
- Testify at ICC Hearings



**DC
AT** Development Center for
Appropriate Technology

GreenWeaver
INC

OVERVIEW

While foam plastic insulations such as polystyrene (EPS & XPS), polyurethane, and polyisocyanurate are widely used in buildings to improve energy efficiency and reduce greenhouse gas emissions, the added flame retardants can pose serious human health and environmental hazards. Our goal is to open the door to allow flame retardant free foams to be used in buildings in fire safe conditions.

- U.S. building codes require foam plastic insulation to pass an inappropriate flame spread and smoke development test (Steiner Tunnel Test), resulting in the addition of thousands of tons of flame retardants to these insulation materials annually.
- Some flame retardants used to meet this requirement pose serious human health and environmental hazards. Research shows that when foam insulation is protected by a code-mandated thermal barrier, by concrete, or by soil (below grade), these flame retardants provide no additional fire safety benefit.
- Changing the building codes to exempt thermally protected foam plastic insulation from this test creates the opportunity for non flame retardant foam plastic insulation to enter the market, resulting in healthier, more environmentally responsible and less expensive buildings — without jeopardizing fire safety.

CURRENT CODE

The International Residential Code (IRC) 2012 Chapter 3 requires that foam plastic insulation (with a few exceptions):

- Shall have a flame spread index (FSI) not more than 75 and a smoke developed index not more than 450 in accordance with ASTM E84 (Steiner Tunnel flame spread test) or a similar test, UL723.
- Be separated from the interior of a building by an approved 15 minute thermal barrier of 1/2" gypsum board or barrier.

PROBLEMS WITH CURRENT CODE

The flame spread index (FSI) and smoke development index have been in building codes since the 1950's to measure the surface burning characteristics of building materials. The Steiner Tunnel test, used to measure flame spread and smoke development, has long been known to give inaccurate results for plastic foam insulation, noted in the description of the standard itself. In 1978, Factory Mutual Insurance issued an advisory stating the "*Flame spread ratings by ASTM-E84 tunnel test should be disregarded for foam plastics.*"

Research by the National Institute of Standards and Technology (NIST) and it's predecessor, the National Bureau of Standards confirmed that:

- The ASTM E84 test is unreliable in characterizing the fire hazard properties of foam plastics.
- Foam plastic insulation when not protected by a thermal barrier has an unacceptable level of fire hazard, irrespective of the use of flame retardants.
- The required thermal barrier (1/2" gypsum board) protects the foam insulation from ignition for at least 15 minutes. U.S. fire statistics show that, due to use of thermal barriers, foam insulations rarely present a fire safety hazard. Insulation within a structural area was the primary contributor to flame spread in only 2% of U.S. home structure fires, resulting in no civilian deaths and 40 injuries (1% of total for the entire U.S.).

Flame Retardants

Plastic foam insulations are currently treated with halogenated organic compounds. These present a number of environmental and health issues:

Fire Toxicity

- Most fire deaths and fire injuries result from the inhalation carbon monoxide (CO), smoke, soot, and other irritant gases. These combustion by-products can be significantly increased when foams treated with halogenated flame retardants burn.
- Halogenated flame retardants used currently in foam plastic insulations can also produce dioxins when they burn. Dioxins may be contributing to increased cancers in fire fighters.

Health and Environmental Concerns

The two main flame retardants added to foam insulations are HBCD and TCPP.

- HBCD (hexabromocyclododecane) is typically used in polystyrenes, in concentrations of up to 1% in expanded polystyrene (EPS), and up to 5% in extruded polystyrene (XPS). Concerns about HBCD include possible human health effects, aquatic toxicity, and bio-accumulation. In animal studies, it causes endocrine disruption and adversely affects the developing nervous system. This global contaminant is scheduled to become the 22nd chemical banned in 180 countries under the Stockholm Convention.
- TCPP (1-chloro-2-propyl) phosphate is typically used in polyurethane and polyisocyanurate foams in concentrations of up to 10%. TCPP is a potential carcinogen, accumulates in the liver and kidneys, and may affect the developing nervous system. TCPP is found globally in water and wildlife.
- Proposed substitutes like Emerald 3000 and GreenCrest are also organohalogens and pose similar fire toxicity and lifecycle pollution issues.

Code Change Proposals

Safer Insulation Solution has led the effort to introduce changes to the 2015 International Residential Code. These would not require any changes in current practices or preclude the use of flame-retarded foam insulation, but would create the possibility for manufacturers to meet the rapidly rising demand for foam plastic insulation without halogenated flame retardants. The increasing number of architectural and engineering design firms large and small, their clients, home owners, and green building and product certification programs concerned about the toxicity of flame retardant chemicals is driving market demand that is stymied by the current code provisions. This change would create the opportunity for more diversity in the market, encouraging the development and use of new products that are safer for humans and the environment without sacrificing any fire safety. The changes better align with the intent of the codes to establish “minimum requirements to safeguard the public safety, health and general welfare” and to provide “safety to fire fighters and emergency responders during emergency operations (R101.3)”. Such changes would also increase use of foam plastic insulations, which are important for building energy efficiency by potentially decreasing cost and by allowing flame-retardant free materials to be used in a code-compliant way for those concerned about flame retardant chemicals.

For copies of the code change proposals and public comment modifications, go to www.saferinsulation.org.

PROPONENT ORGANIZATIONS



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ABOUT US

The *Safer Insulation Solution* is a national effort working to reduce human and ecological hazards related to toxic flame retardants in plastic foam insulation, and reduce building costs without reducing fire safety. The group includes architects, builders, scientists, fire safety experts, firefighters, health and environmental advocates, and leading companies, and emerged from research by the Green Science Policy Institute, fire safety and other experts.

Safer Insulation Solution Team

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- **David Eisenberg**, Development Center for Appropriate Technology
- **Alex Wilson**, Founder and Executive Editor, BuildingGreen
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IRC Proposal Proponent Organizations

Dr. Vytenis Babrauskas, Fire Science and Technology, Inc.,

submitting on behalf of:

- American Institute of Architects
- United States Green Building Council of California
- Cascadia Green Building Council
- Development Center for Appropriate Technology
- Green Science Policy Institute
- Hammond Fine Homes
- International Living Future Institute
- Perkins + Will
- San Francisco Firefighters Cancer Prevention Foundation

LEARN MORE AT: www.saferinsulation.org