Climate-friendly foam building insulation may do more harm than good

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The padding PolyFR is the most sold and used in the contract sector (hotels, ships, apartments, hospitals, etc..). Also approved in Class 1 IM, is entirely composed of fire retardant polyester thermo bonded. Hypoallergenic and resilient, Fr Poly does not create dust, it is washable at 60 ° C and due to its characteristics is not easily attacked by moths, mold or insects. Credit: materieprimematerassi.it

The use of the polymeric flame retardant PolyFR in "eco-friendly" foam plastic building insulation may be harmful to human health and the environment, according to a new commentary in *Environmental Science*

& Technology. The authors' analysis identifies several points during the lifecycle of foam insulation that may expose workers, communities, and ecosystems to PolyFR and its potentially toxic breakdown products.

With the climate crisis fueling demand for energy-efficient [insulation](#), the production of PolyFR is increasing rapidly. That's because this [flame](#) retardant is added to all [foam](#) plastic building insulation in North America to comply with flammability codes, replacing the flame retardant hexabromocyclododecane that has been globally phased out due to its toxicity and persistence. PolyFR is commonly assumed to be safe. However, the authors question that assumption.

The presumed safety of PolyFR hinges on the claim that as a large molecule called a polymer, it has few opportunities for release from foam insulation. But the authors' analysis shows that in fact, PolyFR in building insulation has significant opportunities for release into the environment during manufacturing, installation, and disposal of foam insulation. Once released, the PolyFR may break down into harmful chemicals that can end up in people and ecosystems.

"Since so much PolyFR is being used and so little is known about its release into the environment, we need to have realistic assessments of the potential for PolyFR across its life cycle to harm human and [environmental health](#)," said Miriam Diamond, Professor at University of Toronto and corresponding author of the study.

PolyFR is a polymer made from butadiene and styrene, which are both carcinogens. Adding bromine makes it a brominated flame retardant—such flame retardants studied in the past were found to be toxic, and many have been phased out of use.

A greater understanding of the potential for health harm associated with the increasing production of PolyFR, as well as its eventual breakdown

and disposal, is needed to protect workers, fenceline communities near waste disposal sites, and others exposed throughout this flame [retardant](link)'s lifecycle.

Importantly, alternative insulation materials already exist which do not require the use of potentially hazardous flame retardants. Inherently flame-resistant mineral fibers, such as glass wool or stone wool, can be used instead. Also, the fire safety benefit of adding flame retardants should be established before such chemicals are used.

"Making buildings more energy-efficient is a key part of tackling the climate crisis," said co-author Arlene Blum, Executive Director of the Green Science Policy Institute. "But we need to be careful not to create new health and environmental problems along the way. A 'green building' with potentially hazardous insulation isn't a green building at all."

More information: Laura Minet et al, High Production, Low Information: We Need To Know More About Polymeric Flame Retardants, *Environmental Science & Technology* (2021). [DOI: 10.1021/acs.est.0c08126](link)

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