

Foam Insulation

Coverage

Plastic foam insulations, in all forms, for use in vertical and horizontal (buildings and infrastructure) construction.

Goal

To change how we specify foam insulations, one of our most GHG intensive building materials, in a way that builds upon market-common capabilities and practices so that we begin to dramatically reduce the GHG emissions burden of the building industry, including horizontal and infrastructure construction.

Background

Plastics including foam insulations have a very long period of degradation, are not infinitely or sometimes even readily recyclable, and break into micro and nano plastics when they enter our waterways.

Some foam insulation products employ a blowing agent with high Global Warming Potential (GWP), which we seek to avoid as part of reducing embodied carbon, or carbon burden, in our material cycles. As the market is constantly in transition, blowing agents can differ between manufacturers and even by product name, and some formulations with lower GWP may have higher price point when they are introduced to the market.

Foam insulations are used often in our building industry, are high performing in R-Value, and are safe and durable over time when well-installed in a long-lived structure.

Definitions

Blowing Agent: the gas used to excite and propel the foam chemical formulations into an insulative structure which includes foam and cells (closed or open) formed by the gas. Note that current market adoption levels indicate that lower GWP insulations are available at no cost difference and performance difference of less than 5% in per inch R-value.

Embodied Carbon: The amount of CO₂ equivalence in mining, and manufacturing of a product.

Global Warming Potential (GWP) ^[1]: A measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO₂). Lower is better.

Chemical	GWP	ODP ^a
CFC-12	10,900	1
CFC-11	4,750	1
HFC-227ea	3,220	0
HCFC-142b	2,310	0.065
HCFC-22	1,810	0.055
HFC-134a	1,430	0
HFC-245fa	1,030	0
HFC-365mfc	794	0
HCFC-141b	725	0.11
HFC-152a	124	0
Cyclopentane	<25	0
n-Pentane	<25	0
Methyl Formate	<25	0
Methylal	<25	0
Other HFOs	<25	0
HFO-1234ze	6	0
Isobutane	3	0
Di-methyl Ether	1	0
CO ₂	1	0

Rigid Foam insulations: Insulation that is in board form and can be purchased in sheets of varying thicknesses. Some common types are XPS (Extruded Polystyrene), EPS (Expanded Polystyrene), and Polyisocyanurate. These boards are produced by more than one manufacturer.

R-value: The thermal resistance per inch of materials. Note that the Energy Code Compliance prescriptive path sets minimum R-values for insulations in buildings. If an insulation has a lower R-value per inch, more insulation will have to be installed to meet code minimum requirements if using the prescriptive compliance path.

Soy-based plastic sprayfoams: These sprayfoam insulations replace some (up to 14% as of 2021) of the petroleum chemical formulation with bio-ingredients such as soy, and typically use a water-based blowing agent, which has GWP of 1.

Sprayfoam Insulations: Site-applied foam insulations installed by a certified installer. These use chemical formulations propelled by a blowing agent on-site to fill cavities, fill bays in framed construction, or to be blanket applied. There are two main types: open cell and closed cell. Closed cell is slightly more rigid once cured, provides a slightly higher thermal performance per inch of depth, and currently uses blowing agents with higher GWP.

Standard Setting and Certifying Programs

EPDs: Type III declaration that "quantifies environmental information on the life cycle of a product to enable comparisons between products fulfilling the same function." The EPD methodology is based on the [Life Cycle Assessment](#) (LCA)^[2] tool that follows ISO series 14040 (from ISO 14025)

Specifications

Where such products are cost competitive and meet form, function, and utility requirements, affected entities shall to the maximum extent practicable procure lower-carbon insulations through the following considerations.

- Provide an EPD. When not available, communicate desire for an EPD to the manufacturer.
- Eliminate use of rigid foam insulations that use HFC-134a as the blowing agent.
 - Preferred blowing agents include water-based blowing agents and 4th generation blowing agents such as hydrofluoroolefins (HFOs)
- When foam insulation products are needed and a lower GWP blowing agent is available within a 25% R-value performance differential per inch, that lower GWP product should be specified.

Entities are encouraged to consider the following

- *Address other aspects of foam insulations.*
 - *Select foamed-in-place products made with alternative, polyurethane-free materials*
 - *Select foam insulations that use no chemicals of concern such as EPA listed flame retardants*
- *Achieve waste reduction through tighter control and planning of delivery, storage, overspray in site-applied conditions, and use of centralized cutting practices for board products.*

- *Further reduce embodied carbon as even lower GWP blowing agents become available.*
- *Reduce use of foam insulations via use of other, lower carbon intensive, insulations such as mineral wool, cellulose, and hempcrete.*

Take-Back/ Recycling

Disposal:

If materials are being transferred for disposition, a record of each disposition shall be retained by the affected entity. Documentation shall be provided to the affected entity demonstrating that these products have been disposed of in an environmentally sound manner in compliance with applicable local, state, and federal laws.

Affected entities are encouraged to:

- Maintain centralized cutting area on-site for more convenient use of cut boards.

Packaging

Packaging shall comply with Environmental Conservation Law section 37-0205. Packaging shall not contain inks, dyes, pigments, adhesives, stabilizers, or any other additives to which any lead, cadmium, mercury or hexavalent chromium is intentionally added or contain incidental concentrations of lead, cadmium, mercury or hexavalent chromium which together are greater than 100 parts per million by weight (0.01%).

New York State encourages affected entities to adopt the following:

- The use of bulk packaging.
- The use of reusable packaging.
- The use of innovative packaging that reduces the weight of packaging, reduces packaging waste, or utilizes packaging that is a component of the product.
- That all packaging remain the property of the supplier and not become the property of the affected state entity under any circumstance or condition. The vendor shall certify that the packaging material will be reused, recycled, or composted, and managed in compliance with applicable local, state, and federal laws.
- Packaging that maximizes recycled content and/or meets or exceeds the minimum post-consumer content level for packaging in the U.S. Environmental Protection Agency Comprehensive Procurement Guidelines.
- Packaging that is recyclable or compostable.

[1] - https://www.epa.gov/sites/production/files/2015-07/documents/transitioning_to_low-gwp_alternatives_in_building_and_construction_foams.pdf