

QUARTERLY TECHNICAL BULLETIN

from Progressive Foam Technologies, Inc.

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(The purpose of this bulletin is to provide customers of Progressive Foam Technologies with critical and vital information about Insulated Siding in the areas of standards, testing, building codes, product performance and other relevant technical aspects which are providing additional support in the sale and installation of this product category. Please direct any questions or inquiries to your sales representative at Progressive Foam Technologies.)

Energy-Efficiency and Modern Building Design is Job #1 in Europe

The president of Progressive Foam, Pat Culpepper, is a member of the Board of Directors of the Expanded Polystyrene Molders Association (EPSMA). He recently represented the North American building and construction molders at the European Union Molders of Expanded Polystyrene annual conference held in Aachen, Germany in May. The purpose of the conference was to hold a world-wide forum to discuss many issues that affect our industry with a focus on recycling, resource-efficient manufacturing processes, new material types, and energy-efficient building technologies.

Europe leads the world in reducing its consumption of non-renewable, carbon-based energy resources. This leadership position has been achieved by a top-to-bottom commitment to reduce dependence on fossil fuels, beginning at the highest levels of government. Although many technological advances have made this possible (such as improvements in solar, wind, nuclear, and geothermal power), approximately 40% of the improvement has come through a significant commitment to an old technology: insulation.

Governments and homeowners throughout Europe have realized that the quickest and lowest cost method of reducing their dependence on fossil fuels and their carbon footprint is to simply improve the energy-efficiency of their current housing stock. They have come to realize that conservation of resources is a logical first step in any strategy to improve the environment and reduce costs. By bringing their residential housing up to modern standards, energy consumption is reduced immediately and permanently.

The number one choice for insulation in Europe continues to be EPS. As a comparison, realize that most North American building codes specify R-19 sidewall insulation in new construction. In Denmark, the modern standard for sidewall insulation is R-40! One of the primary methods of achieving these levels is to add up to 15 inches of EPS to the walls.

Progressive Foam has done a great deal of research to understand how buildings will be constructed in a new world that is facing much higher energy costs and expectations by consumers for a more environmentally responsible home. Insulated Siding is a logical building material available in North America to insulate the sidewalls of new and existing housing stock, estimated by the US Census Bureau at over 115 million homes.

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Open Cell vs. Closed Cell

Homeowners, architects, builders and home improvement contractors continue to ask questions about the various insulating materials available in the building and remodeling industry today. Some of the questions that we hear regularly regard open-cell vs. closed-cell insulation. Which one is used in Insulated Siding? Which one is used in products such as fan-fold leveling boards? Which one(s) absorb water? Which one works better? Which one insulates better?

Open-cell foams are typically soft, like a sofa cushion or the packaging material molded around the pieces of your new digital camera. The cell walls, or surfaces of the bubbles of foam, are broken and air fills all of the spaces in the material. This breakage makes the foam soft or weak. Because of this softness, open-cell foams are not typically used in construction or building materials. Additionally, open-cell foams do not perform well when exposed to water since the openness of their structures allows water to be absorbed into the foam (think of your sofa cushions being soaked in water). Also, the insulating value of this type of foam is directly related to the amount of calm air inside the matrix of broken cells. Since that amount of air is constantly changing, insulating values are changing at the same time. Because the insulating value of these materials is typically not an important part of their overall function, it stands to reason that the R-values of open-cell foams are less than the closed-cell varieties.

In contrast, closed-cell foams, including Expanded Polystyrene (EPS) and Extruded Polystyrene (XPS) differ in that all of their tiny foam cells are closed and packed together. As building products, the advantages of closed-cell foam are many. Due to their structures, closed-cell foams have a higher compressive strength for greater impact resistance. They can withstand impact from hail and other weather extremes. Exposure to water does not affect them since the closed cells allow only minimal amounts of moisture to be temporarily absorbed into the microscopic spaces between the cells (think of a foam cup). Neither their R-values nor structural integrity is compromised by any of this minimal and temporary absorption. Because the closed-cell foams contain an insulator (air) within their cells, the R-value of closed-cell foams exceeds that of open-cell by a wide margin.

At Progressive Foam, all of our EPS used in Insulated Siding is closed-cell foam. The EPS maintains its shape and structural integrity due to its high compressive strength. Even after repeated testing for Water Absorption (ASTM C272), only nominal amounts of moisture (less than 3%) was absorbed into EPS foam. In recent performance tests on Insulated Siding taken from homes in the state of Minnesota, the average moisture content was only 1.4% (report available upon request). EPS gives Progressive Foam's customers a competitive R-value based on its thickness and density. Additionally, because the structure of EPS closed-cell foam maintains its integrity throughout its lifetime, users are assured of receiving the ascribed R-value during its use in the field.

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The Fire Retardant Dilemma

Expanded Polystyrene (EPS) is a highly energy-efficient insulation material whose use in “green” buildings is increasing, particularly in Insulated Siding. However, in order to meet various building codes, fire retardant chemicals (FRs) must be added to Insulated Siding. Currently, EPS is modified by treatment with hexabromocyclododecane (HBCD), a product that has been shown to be effective in low levels as a flame retardant. HBCD is the same product that is used (in higher concentrations) in everyday items such as furniture, packing materials, car interiors, or children’s pajamas. HBCD has been shown to be very effective, even at low levels, as a flame retardant. The amount of HBCD included in EPS insulation is approximately 0.7% of the weight of the foam.

The dilemma occurs when organizations are committed to eliminating products like HBCD from building and living environments because they consider it to be a persistent, bioaccumulating toxic substance. These organizations do not weigh the advantages and consequences of the products that are used; they are only concerned with warning consumers and others about the dangers of the products. The problem building professionals face is trying to select a product that is safe against fire (meets code) and safe for consumer’s health, while trying to follow the advice of watchdog organizations as well.

According to recently completed Life Cycle Analysis (LCA) for EPS, HBCD was not taken into consideration since it is used in such small concentrations in EPS. There is no evidence that exposure to the minimal levels of HBCD in EPS is toxic to humans. Additionally, the HBCD that is present in EPS is trapped in the polymer matrix, so it cannot leach into the environment after polymerization of the polystyrene has taken place.

Currently, HBCD safety is focused on material handling during the raw material production process, and exposure to these chemicals during the manufacturing process is well below OSHA limits. Progressive Foam continually operates air monitoring tests to make sure that detection limits of these chemicals do not exceed OSHA limits. Insulated Siding’s safe, low levels of fire retardant (.7% of total weight) are minute compared to Polyisocyanurate boards (10% of total weight) and polyurethane foams (40% of total weight)*. At these higher levels, it becomes easier to understand why the watchdog organizations are becoming involved in our industry.

Based on these facts, of course the dilemma continues. At Progressive Foam, we are dedicated to manufacturing only the safest, “greenest”, energy-saving material available in an environment that sometimes forces us to compromise. A large part of our daily operation includes research into the use of alternative additives, and possible replacement products have been identified by industry experts. Depending on the performance trials of those products, phase-in will occur on a timetable that has yet to be determined. We encourage all questions regarding the safety of our products as we continue to carefully examine all aspects of the building envelope. In the mean time, Building Professionals who work with Insulated Siding can be assured that their customers are receiving a safe, energy-saving product for their homes.

* <http://www.greensciencepolicy.org/building-materials>

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Further Information on the Energy Tax Credit

Some progress is being made in the efforts to qualify all types of Insulated Siding for inclusion into the Home Energy Tax Credit (See Volume I, Issue I for details on the Energy Tax Credit). Currently, Insulated Siding with Fullback™ Technology (factory-installed foam backer) does not qualify for the tax credit while performing the same function as the field-installed Insulated Siding with Fullback™ Thermal Support System.

As leaders of the Insulated Siding category, Progressive Foam is often called upon to lend expertise to organizations that are working for the improvement of the remodeling and building industry. Tim Holt, Progressive Foam's Director of Product Development and Innovation, recently participated in a series of meetings between representatives of the Vinyl Siding Institute (VSI) and the following government agencies: the National Association of Home Builders (NAHB), the Environmental Protection Agency (EPA), the Department of Energy (DOE), and the Federal Trade Commission (FTC).

The primary purpose of these meetings was to determine what these agencies need to see from the Insulated Siding product category in order to recommend, promote, and market these products in a way that will help everyone understand and compare the products involved. Additionally, the VSI group hoped to gather some support for building code changes and gain a better understanding of IRS product requirements for the Energy Tax Credit program.

According to Holt, the IRS has “never had to deal with a situation in which one part of a product, the insulation, should qualify, and another part, the siding, would not. So we are trying to work in an area that is totally unfamiliar to them.”

The issue of the Energy Tax Credit is still currently being debated, although we are much closer than we have ever been to a sensible resolution. The meetings determined a course of action and gave each agency an opportunity to recommend further studies. Issues such as validity of testing, installation consistency and moisture controls are some of the items being addressed by the industry in response to the agencies' concerns and questions.

“At this point, the ball is in our court to propose a workable solution to the agencies and support their decision-making process” says Holt. “We hope to bring the situation to a resolution sometime this summer.” Stay tuned!