EPS

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Newsline

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Molders Association

The Benefits of EPS Roof Insulation

– W. James Whalen, P.Eng.

Moulded expanded polystyrene (EPS) insulation is widely used as the insulation component in low-slope commercial and industrial roof assemblies in order to reduce the energy loss. The main criterion for selecting the thickness of EPS insulation typically is a cost/benefit analysis designed to balance the capital cost of the insulation against the saving in energy costs over the life of the building. However, there are many other performance criteria that must be reviewed during the design process in order to ensure that the ideal EPS insulation type is selected for the application.

The design parameters required for the insulation component in roof assemblies have been identified in a number of publications. In particular, the desirable properties of roof insulation were reviewed in a 1999 article2 by Mark S. Graham, associate executive director of technical services for the National Roofing Contractors Association (NRCA). That article provides a comparison of material properties for different types of rigid insulation, but emphasizes that test methods used to determine material property values are not always the same for different types of rigid insulation.

The NRCA roofing and waterproofing manual3 provides the desirable properties identified in the Graham article. Ideal rigid insulation would have the following properties:

1. Bitumen and adhesive compatibility—The ability to withstand the effects of adhesives, solvents and hot bitumen at the application temperatures required for installation of a roof membrane.

2. Impact resistance—High enough strength, rigidity and density to resist impact damage.

3. Fire resistance—Incom-bustibility and compliance with insurance underwriter and building code requirements.

4. Durability—Constructed of materials that resist rot and deterioration.

5. Moisture resistance—Resistant to the effects of moisture vapour and free water.

6. Thermal resistance—The highest possible thermal resistance (R-value) so the thinnest piece of material of a particular type of insulation can be used.

7. Stable R-Value—Constant thermal resistance that does not drift with age (i.e. the insulation will not lose thermal resistance over time).

8. Attachment capability—A surface that

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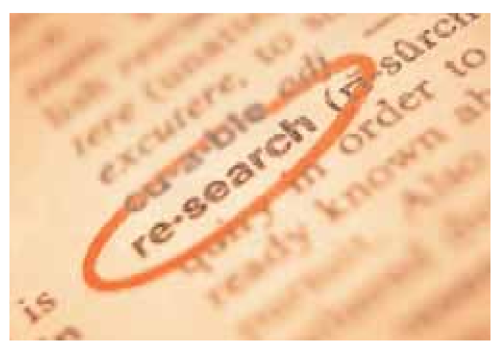
Test Initiatives Highlight EPS Performance

The EPS Molders Association recently embarked on a series of testing on two performance issues: compressive strength and mold resistance. EPSMA's Technical Committee coordinated and provided the parameters for these industry-testing programs.

High Density EPS

In March 2003, a need for a new high density EPS Type was identified by committee members. The objective of the testing was to introduce a new consensus material Type with a compressive resistance of 40 psi which would be submitted to ASTM Committee C16 for consideration to be included in ASTM C578, "Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation". This new EPS Type would be used in high load applications like roofing.

Compressive strength is the ability of a material to resist deflection when forces are applied. It is defined as a unit of force applied over an area. For foam insulation, it is expressed as units of pounds per square inch (psi) or



pounds per square foot (psf). In metric systems, it is Newton per meter squared (N/m2) or kiloPascal (kPa). Compressive strength is an important attribute of insulation to determine its durability during installation and use as well as to assist in the specification of the correct type for an application.

Member companies provided samples ranging in density from 2.4 to 2.7 pcf. The samples were precut into specific dimensions. To ensure consistency, the samples were manufactured using 100% virgin resin without additives and/or recycled content.

During the October 2004 ASTM meetings, EPSMA representatives submitted the test results for review by C578 Task Group 16.20. It was approved and the revised standard is expected to be published by December 2004.

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What's Inside

THE CUTTING EDGE

Betsy Steiner
Executive Director

Energy savings and natural resource conservation have gained increased attention. With volatile energy costs, the construction industry must respond by investigating and implementing new ideas and products that provide savings and sustainability. Rigid foam insulation significantly improves the energy efficiencies of any structure, either as an integral part of a structural system or as a minor building component.

"The Benefits of EPS Roof Insulation" by Jim Whalen, EPSMA's Technical Committee chairman and technical marketing manager for Plastifab, provides a timely look at the performance of expanded polystyrene within commercial and industrial roofing assemblies. This primer gives the essentials of how EPS offers versatility in meeting a wide spectrum of project specific applications.

A profile of a recent EIFS project just completed near Toronto, Canada focuses on how EPS was used to customize 15 different store fronts by showcasing innovative solutions to complete the project on time by developing new systems and capitalizing on site access.

EPS Newsline is only a preview of the information available. The EPS industry is committed to provide accurate and up to date information to architects, specifiers and contractors on the use and performance of expanded polystyrene foam building and construction products. When you encounter questions in the field or on a jobsite, we encourage you to rely on the EPS Molders Association as your primary source of information on expandable polystyrene foam.

Proactive Measures Ensure Product Quality

Quality assurance is a necessary part of operating a successful expanded polystyrene manufacturing facility. Although not stipulated by law, homeowners as well as building officials, building inspectors and contractors rely on these practices to ensure compliance of the product with code and safety regulations. Quality measures also signify an opportunity to boost manufacturing efficiencies, reduce costs, and deliver better performance, all leading to increased sales and more satisfied customers.

A typical quality assurance program consists of several steps and is needed for a variety of reasons including third party certification process, best practices and customer assurance. Manufacturers may also pursue international quality accreditation through ISO 9000 registration.

Initially, an independent testing laboratory or certification facility will subject product samples to a series of recognized safety and performance standards. For EPS used in applications covered by building codes, it has to meet the smoke and flame classifications as required by the building code when tested in accordance with ASTM E84, "Standard Test Method for Surface Burning Characteristics of Building Materials," as well as the performance requirements of the industry standard ASTM C578, "Standard Specification for Rigid Cellular Polystyrene Insulation Thermal Insulation."

When a manufacturer's product has demonstrated its ability to pass the appropriate test protocols, an evaluation report and/or certification validating its use in the marketplace may be obtained from the International Code Council Evaluation Service (ICC ES) or a third party certification agency. This provides the building community with the documentation and supporting evidence to specify EPS building products with confidence.

The initial test process serves as a benchmark to determine a product's compliance with industry standards. Once a product is recognized, the quality assurance process is maintained to ensure the product continually meets or exceeds the appropriate performance requirements. EPS manufacturers typically develop a quality control manual specific to each plant and its operations.

To guarantee ongoing compliance, third party testing agencies will periodically make announced and unannounced visits to EPS plant to conduct audits. The audits are conducted to certify the manual is followed and that product quality is consistent. Typical questions during an audit would include:

Is the finished product traceable back to production and quality control records?
Is the product flowchart or description of the production contained in the manual representative of actual production flow and processes?
Do raw materials match those noted in the manual?
Is the manufacturer conducting the required tests and product inspections prior to final approval and labeling of the product?

If there are deficiencies in the production, the manufacturer is notified and it is specified in the audit report with a request for corrective action. The manufacturer is responsible for rectifying the failure before the next audit or inspection.

Introduced in 1987, ISO 9000, "Quality Management Systems – Fundamentals and Vocabulary," is a series of international quality standards that define the structure for a comprehensive quality management system. ISO 9000 standards apply equally to all industries and require companies seeking certification to define how their quality system meets the requirements of these rigorous standards.

PRODUCT FOCUS

Door Cores

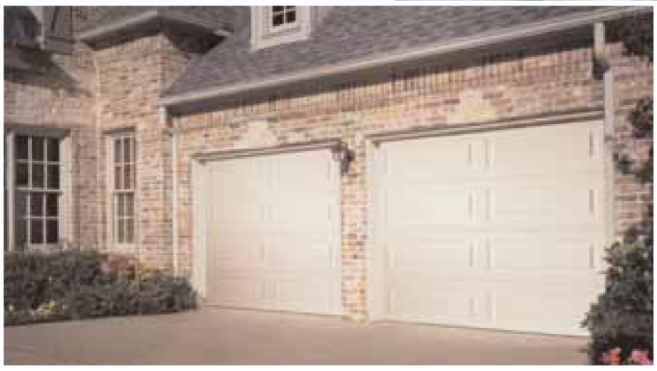
A garage door is usually selected for curb appeal and security reasons. Its structural integrity must be built to withstand constant exposure to the elements. It also receives the most wear and tear – going up and down thousands of times per year. As the largest “door” in the house, special consideration must be given to its thermal performance.

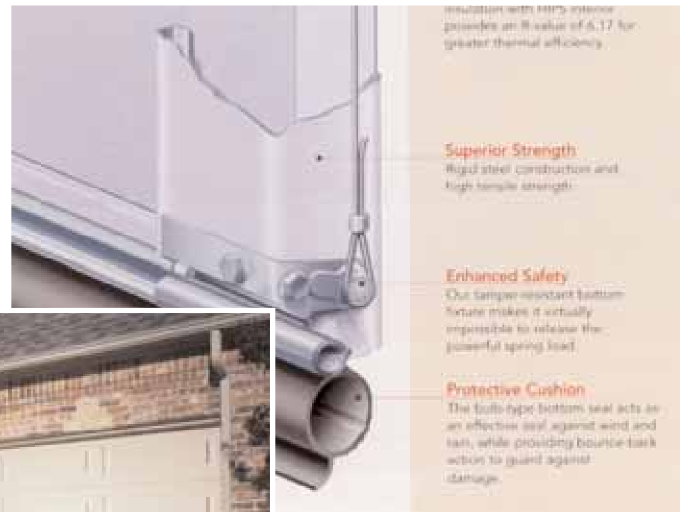
Residential garages are no longer considered just for cars and bikes but as an extension of living space. Even though building and fire codes may be significantly different for garages, they are getting increased attention because a large number are now temperature controlled. The insulation in the garage door now becomes a more obvious and important element. For commercial uses, this benefit is frequently a necessity.

Expanded polystyrene (EPS) and polyurethane are the two most common types of insulation used in doors. Use of these materials provides increased energy efficiency, soundproofing and quieter operation for residential as well as commercial applications. EPS insulation offers several advantages over polyurethane, including stable r-value, decreased cost, and ease of assembly.

Insulated garage doors can be of ‘sandwich’ construction, in which the insulation is hidden between the inner and outer metal pans, or ‘vinyl back’ construction, in which no metal pan is present on the inside of the door. Thickness of insulating cores for sandwich doors ranges from 1-3/8” to 3” thick. Vinyl back construction utilizes only EPS cores adhered to a decorative laminate which faces the inside of the garage. Such cores can also be purchased for non-insulated doors and popped into place by the homeowner.

EPS is preferred due in part to its rigidity, which provides exceptional insulation and air infiltration qualities, as well as adding strength to the entire assembly. The ability to custom cut, rout, or emboss the EPS to fit the exact dimen-





sions provides a tight fit, eliminating thermal breaks.

The Door and Access Systems Manufacturers Association (DASMA) representing North American manufacturers of garage doors, rolling doors, garage door operators, vehicular gate operators and access control panels, developed ANSI/DASMA 107 “Room Fire Test Standard for Garage Doors Using Foam Plastic Insulation”. The ANSI Board Standards Review approved the standard in 1997. Garage doors within one and two family dwellings are currently exempt from the thermal barrier requirement in the US model building codes.

The National Building Code of Canada (NBCC) requires most foam insulation used in garage doors meet certain requirements. Foam plastics must be covered with a thermal barrier or meet performance based on a corner room fire test on accepted standards. The accepted standard, ULC/ORD-C263.7, “Room Fire Test Method for Garage Doors Using Foamed Plastic Insulation,” is expected to be incorporated into the NBCC prescriptive requirements.

ULC/ORD-C263.7 recommends covering foam plastic insulation in lieu of testing. It states that two methods can be used to meet the standard:

Foam plastic insulation must be covered with a minimum of .015” steel foil-faced foam insulation with a flame spread rating of 200 or less and the entire door assembly has a flame spread rating and no air spaces exist within the assembly.

The Canadian standard includes the following additional items not specified in the US version:

- Use of “paper targets” as fire ignition indicators.

- Requirement of a secondary ignition burner.

- Requirement of the use of inorganic reinforced cement board.

Many DASMA members have adopted a performance-rating program to provide clear, precise and easy to read data about each garage door. The Certified Performance Label was introduced in 2003 on new commercial and residential doors. Data on four key performance benefits based on standardized tests are listed: wind resistance, cycle life, thermal efficiency and fire compliance. This enables the consumer, building code inspector or contractor to easily identify if the door meets their needs and meets code requirements.

With a rise in the need for insulated garage doors, thermal performance is under review. The National Fenestration Reporting Council (NFRC) has been working since 1992 via a mandate from the Department of Energy to help improve energy efficiency of all openings in buildings. The result of their focus on windows in recent years is a universal rating system for window efficiency, with standardized performance labels. As with windows, the first step is to establish performance of current garage door products before developing rating systems.

In October 2003, American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) approved funding for research to gather performance data to reduce air leakage and improved U-factor of non-residential doors. The study will encompass eight research projects in the areas of indoor air quality, comfort and health, energy conservation, operating and maintenance tools, environmentally safe materials and design tools. Existing data on thermal performance of roll-up doors, revolving doors, and opaque non-residential swinging, sliding and rolling doors is limited and only simulated results will be made available. The study is expected to take 10 months.

Garage Facts

* In 2000, 82 percent of new single-family homes were built with at least a two-car garage.

* 60 percent of existing garages are for two cars; 8 percent are for three cars.

* 60 percent of new garages are for two cars; 20 percent are for three cars,

SOURCE. U.S. Census Bureau, NAHB

The Benefits of EPS Roof Insulation

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accommodates secure attachment.

9. Dimensional stability—The ability to remain dimensionally stable under varying temperature and moisture conditions.

10. Component compatibility—Formulated to be compatible with other roof assembly components.

The NRCA recognizes that no single commercial insulation can provide all of the 10 properties identified above. As well, it is recognized that appropriate test methods for determination of acceptable product performance based upon these properties are not always available. The performance characteristics of EPS insulation in relation to the above criteria are as follows.

Compatibility with Bitumen and Other Adhesives

Hot asphalt is frequently used in roof assemblies to adhere EPS insulation to wood fibreboard or gypsum board serving as either the thermal barrier or protection board in the roof assembly. In these types of applications, hot asphalt is applied to the wood fibreboard or gypsum board at a specific application rate—e.g. 1 kg/sq. m (20 lb/square)—then allowed to cool to 93-121 C (225-250 F) before applying to the EPS insulation.

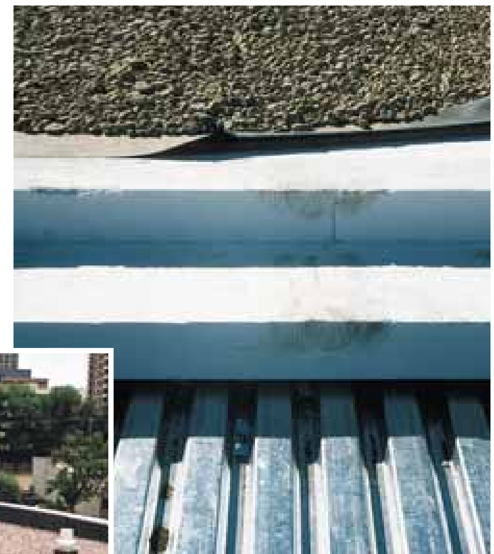
In the application of any adhesive to a substrate, the adhesive must penetrate and adhere to the base layer sufficiently to establish bond without degradation of the bonded insulation. In the case of hot asphalt applied to EPS insulation, the asphalt temperature and the application rate will dictate the success of the EPS insulation bond, as well as any degradation of the bonded insulation. When the above guidelines have been followed, hot asphalt has been used successfully with EPS insulation to adhere laminates in a roof assembly.

Various types of water-based, solvent-free, rubberized asphalt emulsion adhesives are also available for use with EPS insulation. These types of adhesives offer the advantages of low temperature flexibility, non-combustibility and water resistance when cured. They provide excellent bond strength for use in bonding EPS insulation to EPS insulation, laminating cover boards to EPS insulation or attaching EPS insulation to substrates.

Impact Resistance

The mechanical properties of EPS insulation offer a combination of compressive resistance and flexibility to resist impact loads. The three standard EPS insulation types available on the market offer a range of compressive resistance sufficient to support typical roof loads.

When used in roofing applications, the insulation must withstand installation traffic, support fastener loads and the total roofing system. The designer of the building must determine the specific compressive resistance values needed for a roof application based on a review of these criteria.



Foam plastic insulation standards provide compressive resistance based upon loads measured at 10 per cent deformation from original thickness or yield, whichever occurs first. However, when compressive resistance is considered as a design property for foam plastic insulation, it must be recognized that long-term compressive load should not exceed the elastic limit of the product.

Roof loads during construction may be the most rigorous test of the insulation material. In October 1989, the National Roofing Contractors Association (NRCA) issued a report that reviewed the performance of phenolic and polyisocyanurate insulations under simulated field conditions4. The report indicated significant damage to the insulation material could occur during roof construction. Since EPS insulation is commonly used in roofing applications and it was excluded from this report, additional testing was undertaken by Plasti-Fab Ltd. to develop test results under comparable conditions for EPS insulation.

The Plasti-Fab report5 summarized testing completed in June 1993 for phenolic, polyisocyanurate and EPS insulation products subjected to the same test procedure. As with the NRCA test program, the test procedure used simulated traffic over roof insulation during installation of a ballasted loose-laid EPDM roofing system. Each insulation type was tested using five, 10 and 20 passes of a ballast buggy, with and without ballast in place.

Deformation is considered unacceptable if it is permanent or, in other words, the material does not spring back or recover original thickness when the load is removed. Compressed insulation cells typically reduce the insulation value of the material in the compressed area. Unlike many rigid insulation materials, EPS insulation provides good elasticity or resiliency when compressive loads are applied. The damage to EPS insulation samples in this test program after five, 10 and 20 passes of the ballast buggy was restricted to tracking on the insulation surface—i.e. minor compression of the top surface of the EPS insulation along the path of the ballast buggy wheels.

Fire Resistance

Foam plastic insulations such as EPS insulation are permitted in roof assemblies that form part of either combustible or non-combustible construction. For example, Article 3.1.14.2.1 of the National Building Code (NBC) of Canada addresses the use of EPS insulation in metal roof deck assemblies that form part of buildings required to be of non-combustible construction.

NBC Sentence 3.1.14.2.1(1) indicates manufacturers must demonstrate that the insulation component in a metal roof assembly has been tested as a component in a roof assembly complying with the conditions of acceptance in CAN/ULC-S126-M6. The requirement to demonstrate compliance with CAN/ULC-S126-M is waived if any of the following requirements included in NBC Sentence 3.1.14.2.(2) are met for the roof assembly: (a) A 12.7-mm (1/2-in.) gypsum board or other thermal barrier meeting the requirements of CAN/ULC-S124-M is located on the underside of the foam plastic insulation.

(b) The building is sprinklered throughout.

(c) The roof assembly has a fire-resistance rating of not less than 45 minutes.

If any of the requirements in NBC Sentence 3.1.14.2.(2) are met (e.g. building is sprinklered throughout), EPS insulation may be applied directly to the roof metal deck.

EPS insulation is included as an accepted component in a number of CAN/ULC-S126 listed roof assemblies. As well, EPS insulation is included in a number of Factory Mutual Global listed roof assemblies.

Durability

EPS insulation is inert to a wide range of chemicals. It has no food value, will not rot or decay and does not provide any nutrient value for insects, parasites or animal and plant life. As well, EPS insulation is able to withstand temperature cycling, assuring long-term performance. In a series of tests conducted by Dynatech Research and Development Co.,7 test results for EPS insulation core specimens removed from freezer walls, some as old as 16 years, confirmed that EPS withstands freeze-thaw cycling without loss of structural integrity or other material properties.

Moisture Resistance

The closed cell structure of EPS insulation provides excellent resistance to moisture absorption. A study by the Energy Materials Testing Lab (EMTL)8 that exposed EPS insulation to simulated extreme winter conditions demonstrated that EPS insulation installed in well-constructed roofs would not absorb appreciable moisture. The study found that EPS insulation picked up small amount of moisture, in the order of 0.2 per cent by weight, even under conditions characteristic of prolonged, cold, damp winters. Water vapour transmission is the passage of water through a material in the vapour phase. Each roof assembly design should be studied to determine the need for a vapor barrier to control internal condensation. In comparison to other common building materials, EPS insulation has moderate water vapour permeability per unit of thickness. The water vapour permeance characteristics of EPS insulation will vary with thickness (see Table 1, note 2). Where water vapour permeance is a design issue, the EPS insulation manufacturer should be consulted for additional information.

Thermal Resistance Value

The closed cell structure of EPS insulation does not contain a captive blowing agent, such as HCFC. EPS insulation is the only rigid foam plastic insulation not subject to decrease in thermal resistance value as it ages—i.e. thermal drift—as a result of loss of captive blowing agent. In this respect, there is an important distinction to be made between EPS insulation and other rigid foam plastic insulation products whose thermal resistance value changes as the effectiveness of the low thermal conductivity blowing agent introduced into the cellular structure during manufacture decreases.

"EPS insulation is the only rigid foam plastic insulation not subject to decrease in thermal resistance value as it ages."

As requirements for elimination of HCFC blowing agent are adopted by other foam plastic insulation manufacturers, their raw materials and manufacturing processes will need to be adjusted. The raw materials used in the manufacture of EPS insulation have remained consistent over its more than 40-year history with constant improvements in the manufacturing process, including the introduction of vacuum mould technology.

Stable Thermal Resistance Value

EPS insulation was used as the reference material in the National Research Council (NRC) of Canada research program to develop a test procedure for predicting long-term thermal performance of board stock foam insulation containing a captive blowing agent. Because the closed cell structure of EPS insulation contains only air, the R-Value is not subject to thermal drift (decrease) as the insulation ages.

The thermal performance of EPS insulation was reviewed in a supplementary report issued by the NRC9. Based on continuous monitoring over a two-year period in a field condition simulating a roof application and periodic laboratory measurement of the thermal resistance for reference specimens, the thermal resistance of EPS insulation was found to be very stable. The average thermal resistance remained constant over the two-year monitoring period.

Attachment Capability

The design of a roof assembly must include provision for proper restraint of the insulation and other assembly components in relation to:

1. The physical properties of all components within the roof assembly.
2. The effect of attachment method on the insulation components.
3. The composite properties of the individual system components.

A review of EPS insulation response to various attachment methods was conducted under a two-year test program.10 The review, conducted as part of a joint research program involving the EPS insulation industry and U.S. roofing contractors' associations, confirmed that mechanical fasteners or hot asphalt can be used as effective attachment methods for roof assemblies containing EPS insulation.

Dimensional Stability

Dimensional stability in roofing assemblies is a measure of the degree to which a material maintains its original dimensions when subjected to changes in temperature and humidity. The dimensional stability value for EPS insulation in CAN/ULC-S701 (maximum 1.5 per cent linear change) provides an indication of maximum allowable linear dimensional change when the insulation is subjected to an elevated temperature of 70±2 C (158±2 F) for a period of seven days. The CAN/ULC-S701 value is a maximum allowable value; however, actual values from testing of EPS insulation are typically much lower.

The test procedure for determining dimensional stability provides an indication of maximum irreversible change in dimension when a product is subjected to a full thickness temperature change for an extended period of time. The applicability of these values to typical roof insulation

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Test Initiatives Hightlight EPS Performance

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EPS Mold Resistance Testing

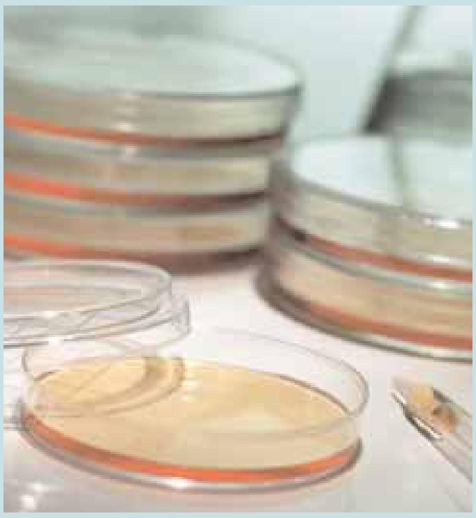
Over the last five years, mold and mildew in building and construction has come to the forefront of media attention. Litigation and promotional materials have obscured the facts to the general public as well as building professionals, ultimately adding more confusion to an already complex scientific issue.

In a 2002 hearing of the House Financial Services Subcommittees on Housing and Community Opportunity and Oversight and Investigations, Jerry Howard, executive vice president and chief executive officer of the National Association of Home Builders (NAHB) made the following statement, "All indoor environments must be considered if we are to address this issue, NAHB encourages efforts to find ways to help prevent or minimize the conditions that lead to mold growth and we support further research into construction practices, building materials, building design and occupant practices to identify factors associated with mold growth within indoor environments. Further, NAHB supports research on the potential health effects of mold exposure in indoor environments that will lead to scientifically sound and reliable data."

The New York Times reported that the Institute of Medicine assembled a panel of epidemiologists, toxicologists and pediatricians to examine the hundreds of scientific papers and reports to assess whether or not mold in homes poses a serious health risk. In 2002, US insurance companies paid out approximately $2.5 billion in claims involving mold and mildew. The panel found no evidence that a link exists between mold and various health conditions.

In response, the EPS Molders Association sponsored a test program focusing on EPS and mold resistance in January 2004. EPSMA contracted SGS U.S. Testing Company for test services on EPS applying ASTM C1338, "Standard Method for Determining Fungi Resistance of Insulation Materials and Facings." The results of the test program provide conclusive evidence that EPS does not support the growth of mold and fungi.

Samples of Type I ASTM C578/Type 1 CAN/ULC 5770 were submitted representing typical EPS insulation products for most building and construction applications.



The test subjected the EPS to the following five specific fungi to check for growth:

- Aspergillus niger
- Aspergillus versicolor
- Penicillium funiculosum
- Chaetomium globosum
- Aspergillus flavus

The results show that in a lab under ideal growth conditions, the fungi did not grow.

For more information on EPS performance in building and construction applications, please contact the EPS Molders Association at 800-607-3772 or visit www.epsmolders.org.

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applications where a thermal gradient exists is limited. As a general rule, if the EPS insulation is attached to a substrate, the thermal expansion or contraction of the roof assembly will depend on the expansion or contraction of the other components within the assembly.

Component Compatibility

EPS insulation is compatible with common roof assembly components, including built-up roof and single-ply roof membranes. As noted previously, EPS insulation can be used in roof assemblies for buildings required to be of either combustible or non-combustible construction.

Conclusion

A designer must select an insulation material with the best combination of the desired properties based upon empirical test data and knowledge of past performance. As recognized by the NRCA, no insulation material will provide all of the desired material properties. However, moulded EPS insulation provides a range of material properties that makes it the ideal insulation for a wide variety of roofing applications.

The most notable characteristic of EPS insulation in comparison to other foam plastic insulation is its stable thermal resistance value. Other types of foam plastic insulations are manufactured with the intent to retain a blowing agent, other than air, for a period longer than 180 days. A specific test method11 has been developed to provide a means for predicting the long term thermal resistance (LTTR) based on an accelerated laboratory test because it is recognized that the thermal resistance of these types of foam plastic insulation will decrease with time. However, EPS insulation does not contain a captive blowing agent; therefore, it is not be affected by the LTTR requirement.

The range of EPS insulation types in CAN/ULC-S701 offers versatility in meeting project-specific applications. The material property values in CAN/ULC-S701 provide a means of comparing different types of cellular plastic thermal insulation and are intended for use in specifications, product evaluations and quality control. However, it must be noted that the

test methods used to determine these material properties often do not always predict end-use product performance. The choice of the appropriate type of EPS insulation board will require a review of the above performance criteria for the specific roofing system being considered.

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Canada's Largest EIFS Project

In November 2004, Vaughan Mills, a 1.2 million square foot shopping mall, opened in a suburb of Toronto. Not only is it one the largest malls in Ontario, it is also one of the largest exterior insulated finishing systems projects in retail structures. With over 200,000 square feet of EIFS, the EIFS contractor, Granolite Company Ltd had its work cut out.

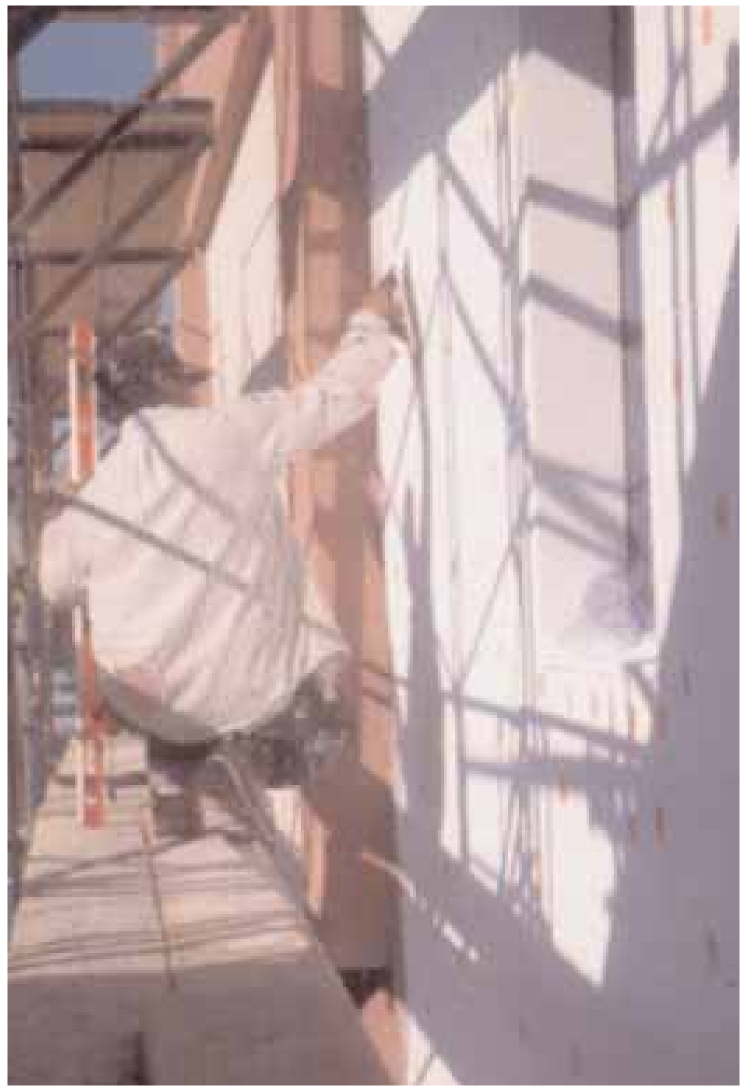
The mall has 15 anchor tenants; each with its own design team so essentially Granolite had 15 separate projects which all had to be completed within seven months. Another hindrance was encountered as work began; several of the anchor designs weren't finalized. "The thing was," commented Geoff van der Lee, senior project manager of Ellis Don Corporation, project manager of Vaughn Mills, "that it would have been nice to get a set of drawings from the (anchor tenants) designers that said how to build it, rather than just a concept that we had to figure out how to build." Communication was key. To ensure the project stayed on schedule, Granolite's project manager, Nic Faienza, meet with builders daily and provided weekly progress reports to keep everyone informed.

First, several different cladding systems were considered. Panelized EIFs would have done the job, but did not have the flexibility to meet the individual needs of each anchor design concept. Ultimately, field-applied EIFs was selected due to the ease of customization. It also provided a "stronger" facade due to a reduced number of joints. Panelized EIFS averages one joint for every 20 feet versus one joint for every 40 to 80 feet for field-applied. "We know that if there was a weakness in the EIF system, it would be in the sealants (chaulking) used at the joints, so we wanted to go with a system with the fewest joints," Faienza commented.

Two separate systems were combined to create one system, ultimately resulting in a more comprehensive warranty. The EIFS system was provided by DeGussa Wall Systems and the expansion joints, sealants and waterproofing by DeGussa Building System. This combination also created a cohesive partnership between the EIFS installers and caulkers. This team merged two systems to a "true single source full façade warranty," points out Christopher Gater, Eastern Canadian sales manager of DeGussa Wall Systems.

Granolite further customized the system by merging a secondary weather barrier and two-stage caulking consisting of a backer rod and caulking separated by a space for moisture drainage. Another backer rod and finish sealant was placed on the front of the panel.

The Canadian Construction Materials Centre (CCMC), a division of the National Research Council conducted performance testing on this new system. During 180 cycles of heat, rain, cold and pressure, water was introduced at the top backside of the wall system for two hours and then allowed to drain for over four hours. Results confirmed that the EIFS system performs well under wet conditions. It also demonstrated that the finishing coat remained intact and the integrity of the bond between the base coat and the substrate was sustained. More Canadian EIFS projects are using this type of moisture drainage system.



In addition to a high level of design customization, the field-applied EIFS provided a wide range of colors to the unique facades. Granolite worked closely with Future Acoustics to produce the more than 60 different hues for Vaughn Mills' tenants.

With minimal restrictions on work space, the site enabled the contractor to erect multi-leveling scaffolding along each "project". This allowed ten crew men to work on several levels at one time paring down the installation schedule significantly. Under normal conditions, a two-person elevating platform scaffolding system is used.

In a market where a 60,000 to 70,000 square foot EIFS job is considered large, the Vaughn Mills project at 200,000 square feet is enormous. The mall opened to the public on time. It houses 15 major retailers in addition to over 200 specialty shops, restaurants and entertainment venues.

EPSMA Member Listing

AFM Corporation
American Polysteel, LLC
Arvron, Inc.
BASF Corporation
Beaver Plastics, Ltd.
Benchmark Foam, Inc.
Cellofoam North America
Comel D.M.C.
Concrete Block Insulating Systems, Inc.
Container Design, Inc.
Contour Products
Demand Hot Wire Systems
DiversiFoam Products
Epsilon Holdings, LLC
Falcon Foam, A Division of Atlas Roofing
Georgia Foam
Hirsch USA
Houston Foam Products
Huntsman Expandable Polymers Company, LC
Insulation Technology, Inc.
Kurtz North America
Le Groupe Legerlite, Inc.
Mid-Atlantic Foam
Northwest Foam Products, Inc.
NOVA Chemicals, Inc
Nuova IdroPress USA
PermaTherm
Phoenix Systems & Components, Inc.
Plasti-Fab, Ltd.
Plymouth Foam, Inc.
Powerfoam
Produits Pour Toitures Fransyl Ltee
Progressive Foam Technologies
Quad-Lock Building Systems Ltd.
Reward Wall Systems
Ship & Shore
StyroChem U.S. Ltd.
Tecnodinamica S.R.L.
Therma Foam, Inc.
Thermal Foams, Inc.
Tri State Foam Products, Inc.
Truefoam Limited

Calendar of Events

International Home Builders Show
January 13-15, 2005
Orlando
www.buildersshow.com

World of Concrete
January 18-21, 2005
Las Vegas
www.worldofconcrete.com

International Roofing Expo (formerly NRCA)
February 16-18, 2005
Orlando
www.TheRoofingExpo.com

EIMA
March 30 – April 2, 2005
Tampa
www.eima.com

EPS EXPO 2005
April 19-21, 2005
Atlanta, GA
For more details:
www.epsmolders.org

Construction Specifiers Institute
April 20-23, 2005
Chicago
www.cisnet.org

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