FACTS | Foam Plastic Applications for Better Building

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Fire Safety & Moisture Protection for Wall Assemblies

Advantages for Code-Compliant Use of Foam Plastic Insulating Sheathing (FPIS) as Continuous Insulation (ci)

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Fire safety and the control of water in its various forms are crucial to the creation of a wall assembly that is durable, safe, and code compliant. When using foam plastic insulating sheathing (FPIS) as continuous insulation (ci) for energy code compliance, two key wall performance considerations for building code compliance include **Fire Safety** and **Moisture Protection**.

FIRE SAFETY FIRST!

The combustibility of a specified continuous insulation material is not the sole factor that determines the fire performance of a building, its exterior wall system, or its exterior wall covering assembly. **Simply put, specifying a non-combustible insulation material does not ensure code-compliant fire safety.** This is why building codes comprehensively address fire-safety in an integrated manner for materials, assemblies, and building systems as a whole.

For foam plastic insulation materials, like FPIS, strict regulations have been in place since 1976. Current requirements for FPIS used in exterior walls for commercial buildings of Type I, II, III, and IV construction are covered in Section 2603.5 of the International Building Code (IBC). These provisions represent some of the most comprehensive, stringent, and effective fire-safety requirements for use of a combustible material on exterior walls of buildings of any height.

A key component of IBC Section 2603.5 is a full-scale, two-story wall fire test method known as the NFPA 285 standard. Many exterior wall assemblies including FPIS have successfully passed this test and are listed here. NFPA 285 has proven to be an effective indicator of acceptable fire performance since 1988. As evidenced by exterior fire events reported internationally, there is an absence of adverse life-safety protection consequences for buildings properly designed and constructed with (1) sprinklers and (2) either NFPA 285 or IBC Chapter 26 compliant exteriors using foam plastics or non-combustible exteriors. **Using NFPA 285-tested assemblies when specifying FPIS ci on buildings of Type I, II, II, and IV construction is a code requirement and it provides confidence in successful assembly performance consistent with actual experience.**

For all building types (including Type V buildings and homes of combustible wood frame construction that do not require NFPA 285-tested wall assemblies), FPIS products must comply with code-required maximum flame spread and smoke-developed indices in accordance with the long-standing ASTM E84 test method. Additional fire-safety features required by code include the use of thermal barriers (e.g., gypsum wall board) or ignition barriers to protect foam plastics from exposure to an interior fire or ignition source – the primary sources of fire risk for buildings. Manufacturers also are required to conduct full-scale fire tests for special approval of applications or conditions of use that are not specifically addressed by the code.

Source: Fire Safety & Foam Sheathing Use

Learn more: **FIRE PERFORMANCE**

For more information, visit continuousinsulation.org

MOISTURE PROTECTION IS IMPORTANT TOO!

The primary function of FPIS ci is to minimize structural thermal bridging and satisfy energy efficiency thermal insulation requirements. However, as a multi-functional material with many benefits, it also protects the building structure from the exterior environment by enabling a thermally stable and dry exterior wall, floor, or roof assembly. Furthermore, the use of FPIS ci can make indoor spaces more comfortable for occupants and aid HVAC system operation for healthy indoor environments.

When properly integrated into a wall assembly as discussed below, FPIS helps to protect buildings from the damaging effects of moisture by providing three things:

1. A durable **water-resistive barrier** system to prevent water intrusion and avoid "trapped" water.
2. Reliable **temperature control** to prevent condensation and moisture accumulation in materials by adsorption of water vapor.
3. Strategic use of **inward drying potential**, resulting in a wall that "breathes out" moisture to promote drying but does not "breathe in" moisture with seasonal changes in vapor drive direction.

WATER-RESISTIVE BARRIER (WRB):

FPIS ci can be used as a durable WRB system to eliminate the need for and cost of a separate WRB material. Code-approved FPIS WRB systems are listed here. FPIS WRB systems must pass the highest WRB water-resistance performance testing requirements as shown in this research report. Even when used with a separate WRB material, FPIS is recognized as a non-water absorbing material layer that protects a wall assembly from the exterior environment, including potentially severe inward vapor drives from moisture-reservoir claddings like stucco as well as anchored or adhered brick and stone veneers. Coupled with drainage provisions in the building code and proper installation, FPIS provides robust protection against water intrusion and entrapped water. Find more information on water-resistive barrier applications of FPIS here.

WATER VAPOR CONTROL:

Using FPIS ci on the exterior side of a wall assembly provides reliable temperature control for protection against condensation and moisture accumulation. All that is required is specification of the proper R-value of FPIS ci based on the climate, coupled with an appropriate interior vapor retarder (or even eliminating it), for maximum inward drying potential and thermal performance. Refer to these wall calculators for assistance with achieving energy code and water vapor control code compliance. Find more information on the use of FPIS to reliably control water vapor here.

DRYING POTENTIAL:

"The more 'breathability' the better" is a common misconception when it comes to walls, along with the idea that it can be achieved by simply placing a vapor permeable water-resistive barrier on the exterior side of any wall assembly. As with fire safety, actual moisture performance must be based on the assembly as a whole, not on any individual layer. Wetting and drying must be balanced with sufficient drying to the inward or outward direction of a wall depending on climate and how the wall was designed to manage moisture. Because water vapor drives switch directions seasonally, too much vapor permeability on one side of a wall at one time of the year can actually result in too much wetting at another time of the year. (Learn more about how walls breath here). Because FPIS protects the wall assembly from the effect of these seasonally changing vapor drives and reliably retains properly balanced inward drying potential, it can strategically control water vapor in a manner suitable to all climates and virtually any wall assembly.

Learn more: **MOISTURE PROTECTION**