

EIFS: WHEN F IS FOR FLAMMABLE

When a fire broke out on the roof of the Monte Carlo Hotel Casino in Las Vegas on January 25, 2008, the fire spread in an unusual way: plastic foam insulation panels on the building parapet burned and melting foam ran down the exterior, starting fires on exterior foam panels below.¹ Fortunately, no serious injuries resulted. For many in the construction industry, the events highlighted the risks associated with Exterior Insulation Finishing System (EIFS), an increasing popular building technique.

Attractive, inexpensive, easy to use, and extremely efficient as insulation, EIFS is used on homes, office buildings, shopping centers, restaurants, apartments, hotels, motels, etc. Easily made to look like stone, stucco or granite, it is used to create facades and soffits and for decorative purposes, including signage or artwork.

From a property risk control perspective, however, EIFS presents two chief challenges: besides being flammable, it is easily damaged. Because the material is soft and can be chipped or carved, it is easily subject to vandalism, especially near ground level.

WHAT IS EIFS?

EIFS is a **non-load-bearing wall assembly system** that attaches sheets of expanded polystyrene or polyisocyanurate to the exterior of buildings. The plastic core is covered by a material that looks and feels like concrete. EIFS can be installed over concrete blocks or panels, or on wood, gypsum board or metal panels.

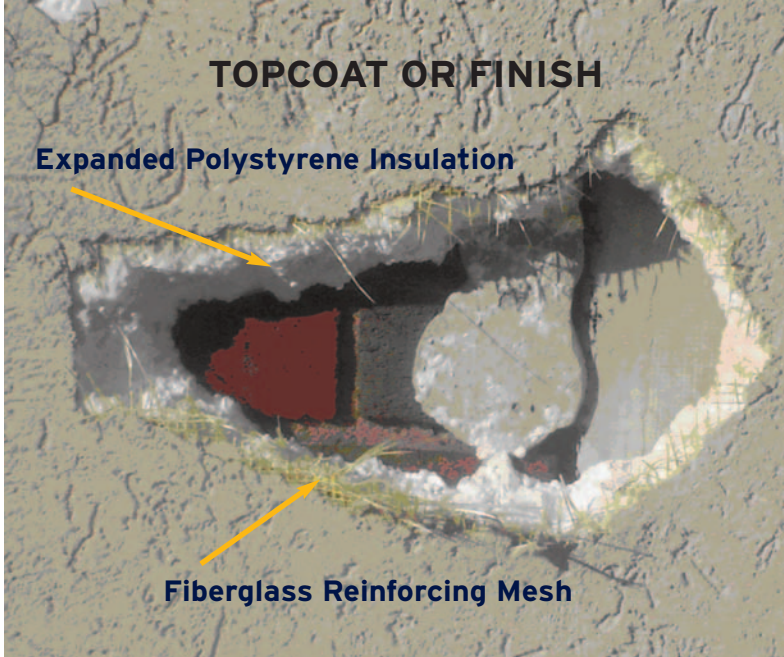
EIFS is installed in layers. The most basic EIFS (a barrier EIFS) consists of three.

1. The first layer is foam plastic insulation (also called simply *foam*) that comes in two-foot by four-foot sheets. If an adhesive is used



to attach the insulation, the adhesive is applied directly to the foam with a trowel. Most EIFSs use a type of insulation called expanded polystyrene, also known as EPS. EPS is a one-pound density expanded polystyrene similar to the white material that coffee cups are often made of. The usual range of thickness for EIFS insulation is three quarters of an inch to four inches, although thicker pieces, called foam shapes, are sometimes used for decorative accents.

2. Next comes a reinforced layer that is applied to the face of the insulation. This consists of a fiberglass reinforcing mesh embedded in a cementitious adhesive. The mesh has an open weave, somewhat like window screening but with openings about one quarter inch square. It is made of fiberglass and can be cut with a utility knife. The mesh is available in various weights, chosen according to how much resistance to damage is required. The standard weight is four ounces. The



high-impact mesh ranges from 15 to 20 ounces. The first two layers together form the *base coat*.

3. The final topcoat is a colored, textured paint-like material, usually applied with a trowel. A wide range of colors and textures are available. Available textures include smooth surfaces, rough stucco-like textures, embedded stone chips, multi-color (granite-like mixtures), and even brick-like treatments. This layer is called the *finish*.²

EIFS was developed in Europe after World War II and initially used to retrofit solid masonry walls. It came into common use in North America in the 1960s, and became very popular in the mid-1970s following the oil embargo and the resultant demand for energy-efficient wall systems. The use of EIFS over stud-and-sheathing framing (instead of over solid walls) is a North American technique. EIFS is now used all over North America and in many other areas around the world, especially Europe and the Pacific Rim.

In North America, EIFS was initially used almost exclusively on commercial buildings. As the market grew, prices dropped to the point where its use became widespread on single family homes.³

THE PROTECTION CHALLENGE

The chief safety hazard stems from the fact that polystyrene and polyisocyanurate are flammable. According to FM Global Data Sheet 8-1, *Commodity Classification*, the heat release rate for these types of foam plastics can be three to five times greater than those of ordinary combustibles (e.g., wood or paper). The heat of combustion of ordinary combustibles generally ranges between 6,000 and 8,000 Btu/lb (13,960–18,600 kJ/kg). The heat of combustion for plastics generally ranges between 12,000 and 20,000 Btu/lb (27,910–46,520 kJ/kg).

EIFS may still be a method of choice in construction projects. But steps can be taken to reduce the risk of combustion.

1. Minimize combustible material and sources of ignition in close proximity to the building. Designated smoking areas and containers are commonly located outside of the structure right next to the exterior wall of the building; building owners/managers should consider moving designated smoking areas away from any structures. Provide receptacles designed for the safe discard of smoking materials.
2. Install outdoor lighting and other electric devices on exterior walls in accordance with the National Electric Code to enhance security and limit incidents with potential ignition sources.
3. Provide automatic sprinklers to protect the exterior of the building, especially under canopies, overhangs, soffits and other areas that may be concealed from view. Where temperatures drop below 40°F, a dry sprinkler system or dry pendent type sprinklers may be needed.
4. The EIFS material used should meet applicable codes and standards. EIFSs are constructed to ASTM C1177, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing, and the finished wall assemblies are tested to meet a combination of fire test protocols.⁴ This includes National Fire Protection Association (NFPA) Standards 255 and 285.
5. EIFSs should be installed in accordance with applicable building codes. Some local codes address EIFS in detail. For example, the Clark County (Nevada) Department of Development Services, Building Division, established a policy on EIFS in 2007 based on Section 2603.5 of the 2003 edition of the International Building Code (IBC). This policy states that any expanded polystyrene or foam plastic insulation in exterior walls must be rendered noncombustible. The policy

limits the thickness of the foam plastic in the EIFS to four inches (10 centimeters) and demands separation of the EIFS from the interior spaces of a building using an approved thermal barrier as a substrate. Other sections of the IBC that may apply include 2603.1 and 2603.5.7.⁵

6. If possible, a wall assembly system listed by a nationally recognized testing agency should be used. Factory Mutual Approved EIFS wall assemblies can be found in the FM Approval Guide under Building Materials, Exterior Roofing and Siding, Wall Coating Systems. (www.approvalguide.com).

Builders and owners using EIFS should also be sure to consider the exposure to damage. Any damage to walls and EIFS components should be repaired as quickly as possible to prevent water from infiltrating the material and causing further damage and mold.



Which section is EIFS and which is stucco on concrete?⁶

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The objective of our publication is to provide a general overview and discussion of issues relevant to loss control. The comments and suggestions presented should not be taken as a substitute for advice about any specific situation.

¹ National Fire Protection Association, NFPA Journal, May/June 2008, Quincy, MA, p. 1.

² http://en.wikipedia.org/wiki/Exterior_Insulation_Finishing_System

³ Ibid.

⁴ NFPA Journal, May/June 2008, p. 3.

⁵ Ibid.

⁶ The grooved section on the right side is Styrofoam; the left side is masonry wall. Photo by David Gluckman of a firehouse wall in Dumont, NJ.