



## EFIS and Some Common Failures

According to definitions set forth by the International Building Code and ASTM International, exterior insulation and finish system (EFIS) is a non-load bearing, exterior wall cladding system that consists of an insulation board attached either adhesively or mechanically, or both, to the substrate; an integrally reinforced base coat; and a textured protective finish coat. EFIS with drainage is the predominate method of EFIS applied today. As the name implies this system helps eliminate moisture before it has an opportunity to enter the wall cavity.

EFIS Systems were first introduced in the United States in the late 1960's and they were primarily used on commercial buildings. EFIS typically consist of the following components:

- **A water resistive barrier (WRB) that covers the substrate**
- **A drainage plane between the WRB and the insulation board**
- **Insulation board typically made of expanded polystyrene which is secured with an adhesive or mechanically to the substrate**
- **Glass fiber reinforcing mesh embedded in the base coat**
- **Water resistant base coat that is applied on top of the insulation to serve as a weather barrier**
- **A finish coat that typically uses colorfast and crack resistant acrylic co-polymer technology**

EFIS was originally designed as a perfect barrier system. One that provides waterproofing protection at the exterior face of the cladding. The principle of barrier cladding systems is to create a face-sealed façade that repels moisture to keep the building dry. Unfortunately barrier systems are rarely perfect. Any breach in the exterior finish will compromise the water tightness of the system. Once moisture finds its way into the barrier system it usually can't find its way back out. Moisture trapped in the wall can lead to leaks, deterioration of building components, wet substrate, mold, and eventually collapse of the weakened cladding. The major culprits that lead to EFIS failure include: poor workmanship, damp climate, impact damage, building movement, and incompatible or unsound substrate.

**Poor workmanship:** there are numerous opportunities for installation errors and poor workmanship to ruin an EFIS job. Incorrect selection or application of sealants, or missing sealants provide an easy path for water entry and premature deterioration. Base coat thickness that do not meet the manufacturer's guidelines is another issue for EFIS systems. Flashings that are incorrectly installed or missing provide an avenue for water infiltration.

**Climate factors:** a humid climate with limited drying potential can be detrimental to EFIS systems, particularly if the rate of wetting exceeds the rate of drying. Building height, overhangs, exposure, and façade details all affect the path of rainfall, channeling more or less moisture toward the cladding and need to be taken account of during design. In cold climates, if the system is applied at temperatures below the manufacturer's design range it may lead to premature failure.

**Impact damage:** EFIS Systems consist of a thin, brittle coating over a soft substrate and can be easily damaged by impact. Scrapes, dents, or holes can all lead to moisture intrusion, so it is important to provide extra reinforcement at susceptible locations.

**Building movement:** to prevent irregular cracking, sufficient provisions for expansion and contraction should be part of the design. In concrete substrates, movement tends to come in the form of frame shortening where the concrete deforms over time due to shrinkage and creep. Wood substrates tend to experience contraction and expansion from changes in humidity. Steel structures tend to see building movement at long-span beams, where transverse forces are greatest and deflection is more likely.

**Incompatible or unsound substrate:** gypsum board, often used with EFIS, tends to exhibit problems with moisture absorption. Poor quality control in the production of oriented strand board (OSB), has raised concerns about premature failures in EFIS systems. Even if the substrate is of high quality and suitable for the building location, failure to correctly specify or install substrate attachment may lead to a premature failure.

Until next time my friends, be prepared and stay safe.

**Events**

- Sept 4: Labor Day
- Sept 6: IFMA Luncheon
- Sept 7: ACA Luncheon
- Sept 12: SACA Luncheon
- Sept 20: SA BOMA Luncheon
- Sept 20: AAFAME Luncheon
- Sept 20: IIASA Luncheon
- Sept 21: AUSTIN BOMA Luncheon
- Sept 21: SAABE Luncheon
- Sept 22: IREM Bowling
- Sept 28: IWSA Luncheon
- Sept 29: CE Class

# September 2017

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4 Labor Day Office closed	5	6 IFMA Luncheon	7 ACA Luncheon	8	9
10	11	12 SACA Luncheon	13	14	15	16
17	18	19	20 IIASA Luncheon SABOMA Social AAFAME Luncheon	21 Austin BOMA Luncheon SAABE Luncheon	22 IREM Bowling	23
24 31	25	26	27	28 IWSA Luncheon	29 CE Class	30

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