

# White Paper WP001

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Differences between EnCon Insulated Precast and EIFS



ISSUED	REVISION	SHEET TITLE
10.09	Rev 3	Insulated Precast and EIFS
White Paper WP001		

Cover

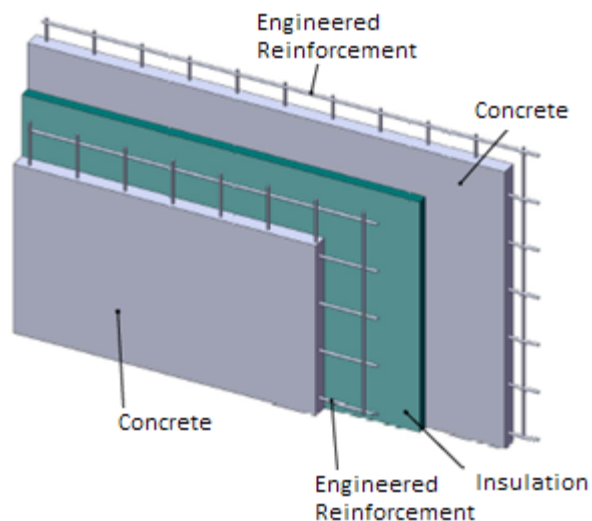
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## Differences between EnCon Insulated Precast and EIFS

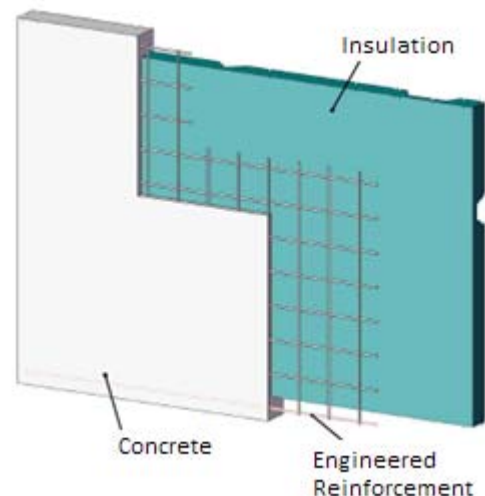
EnCon produces a number of different insulated precast concrete products. They range from Insulated Wall panels, Styrocore Insulated Wall Panels, CarbonCast® Architectural Spandrels and AltusGroup™ Insulated Wall Panels. This paper will describe the difference in construction and design between EnCon Insulated Precast/Prestressed Concrete Products and the EIFS (Exterior Insulation Finish System) product while highlighting the common problems of EIFS. EnCon does not manufacture any EIFS products.

### EnCon Insulated Precast Concrete Products

EnCon's Insulated Precast Concrete Products come in a variety of shapes, sizes, reinforcing techniques, and architectural finishes but they all have one thing in common; they are engineered against cracking under all service conditions. These products are predominantly used for the exterior building envelope and are designed to prevent moisture infiltration into the structure for the life of the structure. The construction process for each of these products starts with a registered engineer designing each individual unit not to crack. In addition, many of the products are prestressed, a reinforcing technique developed to increase span, capacity, and decrease the propensity for cracking. A CarbonCast® Architectural Panel provides a minimum of 1¼" inches of concrete reinforced with a carbon fiber composite material backed with either expanded or extruded insulation. The EnCon insulated wall products have a minimum face thickness of 2" and in applications where a hard concrete interior surface is required; a concrete face with a minimum thickness of 2" is placed over both sides of the insulation. This creates an encapsulated zone of insulation between two reinforced concrete surfaces. There is no biological material on which the mold spores may propagate.



**Insulated Concrete Wall Panel**



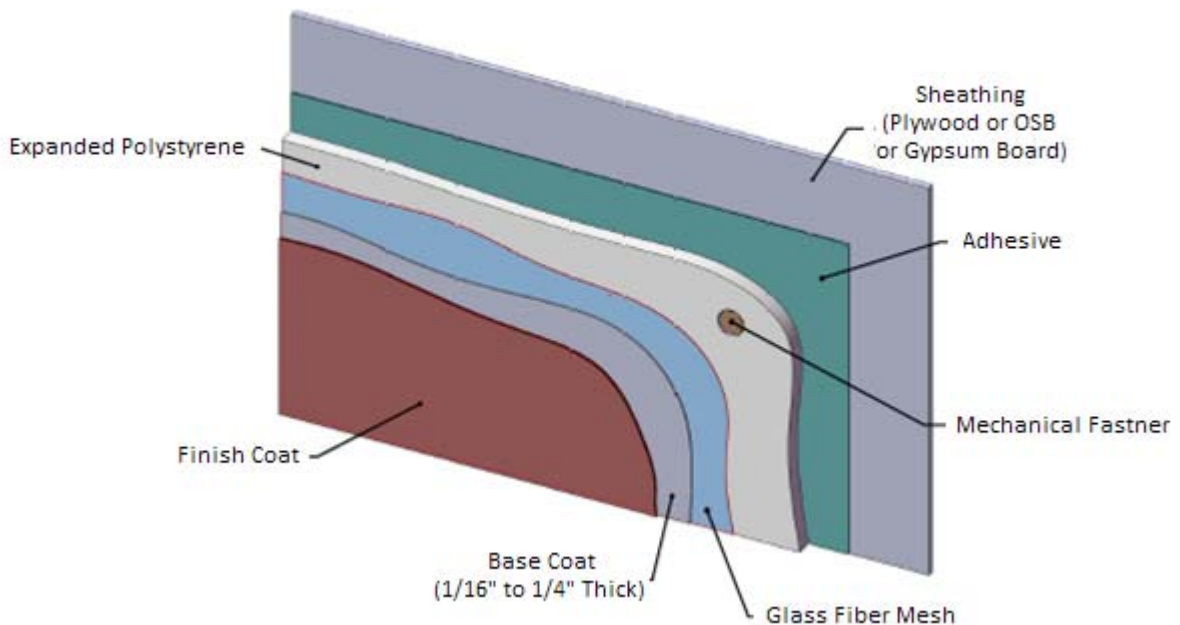
**CarbonCast® Architectural Panel**



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## EIFS – Exterior Insulated Finished Systems

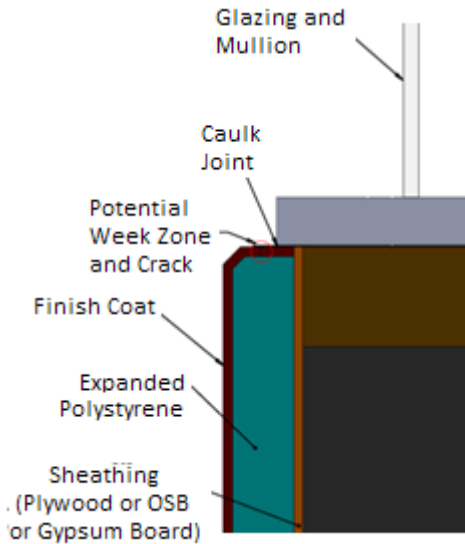
EIFS is a finishing technique where cementitious top and base coats are applied to Expanded Polystyrene Insulation. The Insulation is applied directly to the structured sheeting either through glue or mechanical fasteners. Due to the construction method the exterior can be somewhat soft and susceptible to cracking and indentations and penetrations after construction is complete. When the finished surface becomes damaged, water infiltration and mold are common problems. The water will find its way directly into the underlayment through the mechanical fasteners, through joints in the insulation boards or both. The underlayment is then exposed to moisture and the potential for mold growth is very high in cases of plywood or OSB (Orientated Strand Board). Often the water penetration goes unnoticed and mold buildup becomes catastrophic.



**Typical EIFS Cross Section**

Another form of EIFS is a pre-manufactured panel of insulation with a structural metal frame coated in a thin base and finish coat. Although similar to the concept of a Precast Panel, the EIFS Panel system is not engineered for rigidity or to prevent surface cracks. The strength and stiffness come from the Styrofoam/Steel Frame interaction. Latest EIFS system designs have included a vapor barrier between the insulation and sheathing. Although this provides better moisture control in the field, portions of the insulation, mechanical fasteners still penetrate this membrane and create a potential source of moisture intrusion.

## Other Concerns



While the surface of an EIFS system is prone to damage and moisture, common window and door details create a challenge in the building envelope as well. Within these details it is possible for the cementitious material to be thinner than and not as strong as the surrounding substrate, cracks form and provide methods for moisture infiltration. The caulking around windows and doors may be adhered to this thinner region also, as the materials change with thermal gradients; cracks may form. For this, the EIFS solution is at a strong disadvantage. Precast concrete solutions for openings are not as complex. The materials in these regions are of the same structural integrity and thickness as the other portions of the panel. There are no issues with workmanship or thinning sections that may be found in similar EIFS details. For this, the precast solution is at a strong advantage.

EIFS has also been known to be a viable home to birds. Birds will make small holes in the surface and burrow deep into the insulation. These caverns make for ideal nesting places and are very difficult to prevent once started. Shown right is a woodpecker high in a perch made from a hole in the side of a home with EIFS siding. Even the thinnest sections of an insulated precast panel are too thick for a woodpecker to break through.



Another major concern regarding EIFS is fire. The insulation and other common construction adhesives may be highly flammable. Although the completed EIFS system looks like noncombustible stucco, it is combustible. The flame spread rating is low for typical insulation material but the smoke produced is dense and black. Although the completed EIFS system is more difficult to ignite than the exposed foam-board, ASTM E84 tests of the completed EIFS system show results similar to those of the foam-board alone and once ignited, the thin Cementitious cover offers little protection.

Precast concrete offers a significant advantage in the event of a fire due to the amount of cover over the reinforcement and the total thickness of the face. Typical insulated wall panels have above a 2hr fire rating and the CarbonCast® Architectural Panel can be design to a 1hr rating.

## Common Construction Problems with EIFS

- Failure to install or properly install sealant joints around windows, doors, pipes, conduits, and other penetrations of the field of the EIFS.
- Failure to flash window and door openings in the field of the EIFS to divert leakage through the window or door to the exterior.
- Failure to install diverters (kick-out flashing) at ends of roof flashing terminating in the EIFS wall.
- Failure to properly backwrap edges of EIFS at terminations and penetrations in the field of the EIFS.
- Failure to install expansion joints at floor lines in EIFS applied over wood frame construction.
- Failure to notch insulation boards at corners of openings for windows and doors to avoid insulation board joint at the corner of the opening.
- Failure to install diagonal mesh in lamina at corners of openings for windows and doors.
- Failure to terminate EIFS above grade, especially in termite prone regions.
- Installation of decks over EIFS without proper flashing.
- Unrepaired impact damage.
- Inadequate base coat applications at corners.
- Inadequate base and finish coat application in reveals.
- Installation of reveals at board joints.
- Lack of adequate slope on skyward facing surfaces.
- Damage from ropes, cables, etc. to EIFS parapet tops.

A high number of lawsuits and claims have been presented to legal counsel and insurance companies around the United States related to pest problems, mold and moisture, failed building envelopes, and fire. Many of these recent claims resulted from an EIFS solution that was susceptible to fracture and failure.

An engineered insulated precast concrete panel is a very different solution for a building envelope. It offers a crack resistant non-biological surface to protect against pests, fire, airborne debris, fracture, and ultimately water penetration.

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**Includes subsidiary companies and insulated precast products manufactured by  
EnCon Utah, EnCon Washington, EnCon Colorado, Stresscon Corporation, Atlanta Structural**

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