

# Plasti-Fab Design Manual

# Exterior Insulation Finish Systems





## Exterior Insulation Finish Systems (EIFS)

PlastiSpan EFS insulation is a moulded expanded polystyrene (EPS) insulation board used in Exterior Insulation Finish Systems (EIFS). EIFS are non-load bearing exterior wall cladding systems typically consisting of PlastiSpan EFS insulation attached to a substrate, an integrally reinforced base coat applied to the face of the PlastiSpan EFS insulation and a protective finish applied to the surface of the base coat. The PlastiSpan EFS insulation is attached to the substrate using specially formulated adhesives and/or mechanical attachment.

PlastiSpan EFS insulation used in EIFS applications covers the outside of the building so that the structure is isolated from the wide temperature fluctuations of the climate. This reduces expansion and contraction of the structure and stabilizes interior temperatures. When using PlastiSpan EFS insulation in EIFS applications it provides a complete exterior blanket of insulation in a simpler manner than application of insulation on the interior.

PlastiSpan EFS insulation is manufactured under a stringent quality control program to meet the requirements of EIFS manufacturers that includes third party certification of material properties. PlastiSpan EFS insulation can be supplied to any thickness required to provide specified thermal resistance (R-Value) and special shapes can be provided that will create the style or form needed for the building.

Period styles or clean modern shapes can be produced for building facades by forming PlastiSpan EFS insulation into special shapes. Since PlastiSpan EFS insulation is lightweight, special features can be created without any additional structural load on the building. Plasti-Fab will assist in the design of shapes, which can be created in-plant to provide an almost unlimited variety of old or new building styles.

EIFS manufacturers use PlastiSpan EFS insulation because it is flexible, resilient and permits some thermal expansion/contraction of the applied finish or building movement without cracking the exterior finish. The etched finish of PlastiSpan EFS insulation provides an excellent surface for bonding finish materials or the adhesives used in connection with them.

PlastiSpan EFS insulation is a rigid closed cell insulation whose equilibrium moisture content is extremely low. If a material with a high equilibrium moisture contents is exposed to variable temperature and relative humidity, it may take up



water at one point only to give it off later with this cycle being repeated many times.

For instance, cellulose materials tend to have high equilibrium moisture contents. The mass fraction of water in wood can be 30% or more, depending on how fresh the wood is and the atmosphere in which it is kept. The mass fraction of water in wood that has reached equilibrium moisture content at a temperature and relative humidity of 20°C (68°F) and 55% RH is only 10%. If this wood were brought to a temperature and /relative humidity of 40°C (104°F) and 90% RH, it would take up moisture from the air until its water content was 19%.



The mass fraction of water in PlastiSpan EFS insulation at equilibrium is less than 1%, but at such levels it is difficult to follow any changes. After the moisture content of the insulation has attained its equilibrium value under given conditions, changes may take place as conditions alter, but these changes would not exceed 0.15% of the mass of the material. So PlastiSpan EFS insulation used in EIFS applications is passive in that it cannot affect the internal climate of a closed wall system as do cellulose materials that lose water to a drier atmosphere and gain it from a humid one.

PlastiSpan EFS insulation does not decay or rot. In addition, PlastiSpan EFS insulation does not support the growth of fungi or bacterial growth. However, it is important to remember that successful use of PlastiSpan EFS insulation, as with any product, depends upon its correct installation in accordance good building design practice.

PlastiSpan EFS insulation is one component in a wall system whose purpose is to minimize heat transfer and, in turn, energy consumption.

## Application

Follow Exterior Insulation Finish Systems manufacturer's instructions for the application of the PlastiSpan EFS insulation and adhesives.

## Specification

### Insulation

PlastiSpan EFS insulation meeting the requirements of CAN/ULC-S701, Type 1, thickness and shapes as shown on drawing (or specify).

## PlastiSpan EFS Insulation Properties (See Notes 1 & 2)

MATERIAL PROPERTIES	TEST METHOD	METRIC (SI) UNITS	CAN/ULC-S701	IMPERIAL UNITS	CAN/ULC-S701
			TYPE 1		TYPE 1
<b>Thermal Resistance</b> <sup>3</sup> Minimum	ASTM C 518	$\frac{\text{m}^2 \cdot \text{°C}}{\text{W}}$	0.65	$\frac{\text{ft}^2 \cdot \text{hr} \cdot \text{°F}}{\text{BTU}}$	3.75
<b>Compressive Resistance</b> Minimum @ 10% Deformation	ASTM D 1621	kPa	70	psi	10
<b>Flexural Strength</b> Minimum	ASTM C 203 Procedure B	kPa	170	psi	25
<b>Water Vapour Permeance</b> <sup>4</sup> Maximum	ASTM E 96	$\frac{\text{ng}}{\text{Pa} \cdot \text{s} \cdot \text{m}^2}$	300	perms	5.2
<b>Dimensional Stability</b> Maximum	ASTM D 2126 7 days @ 70 ± 2° C	% linear change	1.5	% linear change	1.5
<b>Water Absorption</b> Maximum	ASTM D 2842	% by volume	6.0	% by volume	6.0
<b>Limiting Oxygen Index</b> <sup>5</sup> Minimum	ASTM D 2863	%	24	%	24

## Additional Material Properties Not Specified in CAN/ULC-S701

<b>Coefficient of Thermal Expansion</b>	ASTM E 96	m / m / °C	6.3 x 10 <sup>-5</sup>	in / in / °F	3.5 x 10 <sup>-5</sup>
<b>Shear Modulus</b> Maximum	ASTM D 2126 7 days @ 70 ± 2° C	kPa	400	psi	58
<b>Tensile Strength</b> Minimum	ASTM D 2842	kPa	103	psi	16

- NOTES: 1. PlastiSpan EFS insulation is listed in the CCMC Registry of Product Evaluations under CCMC Evaluation Listing 12424-L.  
2. The properties of PlastiSpan EFS insulation board manufactured to CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering, are third party certified under a listing program administered by Underwriters' Laboratories of Canada (ULC).  
3. Thermal resistance measured at mean temperature of 24°C (75°F) for 25 mm (1 inch) thick material.  
4. Values quoted are maximum for 25 mm (1 inch) thick material. Lower values will result for thicker materials.  
5. PlastiSpan insulation board has a maximum Flame Spread Rating of 290 and a Smoke Developed Rating greater than 500 for minimum thickness of 25 mm classified in accordance with CAN/ULC-S102.2M.