

Product Information Bulletin 310

Precast Concrete Insulated Wall Panels

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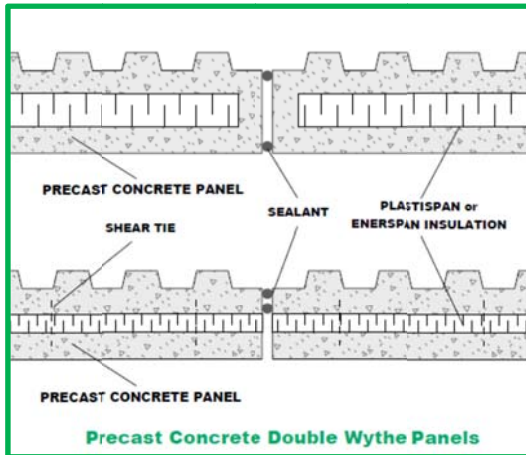
Precast concrete insulated wall panels can be economically manufactured by incorporating **PlastiSpan**[®] or **EnerSpan**[®] rigid expanded polystyrene (EPS) insulation into the panel at time of manufacture. The precast concrete panel consists of a double concrete wythe with insulation between the wythes to provide a fully insulated finished wall section.

PlastiSpan and **EnerSpan** insulation are manufactured to meet or exceed CAN/ULC-S701¹. **PlastiSpan** insulation is rigid, closed cell insulation that provides thermal resistance (RSI) meets minimum CAN/ULC-S701 requirements for expanded polystyrene (EPS) insulation. **EnerSpan** insulation is a rigid, closed cell, silver-gray insulation that provides an RSI that exceeds minimum CAN/ULC-S701 requirements². Material properties are provided in the table below.

| Material Property | Units | Type 1 | | Type 2 | |
|---|-----------------------------|-------------------|-----------------|----------------------|--------------------|
| | | <i>PlastiSpan</i> | <i>EnerSpan</i> | <i>PlastiSpan HD</i> | <i>EnerSpan HD</i> |
| Thermal Resistance <i>Minimum per 25 mm (1 inch)</i> ASTM C518 | m ² ·°C/W | 0.65 | 0.82 | 0.70 | 0.82 |
| | (ft ² ·h·°F/BTU) | (3.75) | (4.7) | (4.04) | (4.7) |
| Compressive Resistance <i>Minimum @ 10% Deformation</i> ASTM D1621 | kPa | 70 | | 110 | |
| | (psi) | (10) | | (16) | |
| Flexural Strength <i>Minimum</i> ASTM C203 | kPa | 170 | | 240 | |
| | (psi) | (25) | | (35) | |
| Water Vapour Permeance <i>Maximum</i> ASTM E96 | ng/(Pa·s·m ²) | 300 | | 200 | |
| | (Perms) | (5.2) | | (3.5) | |
| Water Absorption <i>Maximum</i> ASTM D2842 | % By volume | 6.0 | | 4.0 | |
| Dimensional Stability <i>Maximum</i> ASTM D2126 | % Linear Change | 1.5 | | 1.5 | |
| Limiting Oxygen Index <i>Minimum</i> ASTM D2863 | % | 24 | | 24 | |

1. **PlastiSpan** and **EnerSpan** insulation material properties are quality controlled to meet or exceed CAN/ULC-S701, **Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering** under a third party certification program by administered by Intertek.

2. **EnerSpan** insulation is manufactured using **Neopor**[®] **F5300 GPS Plus**, a graphite-enhanced expandable polystyrene (GPS) raw material provided by BASF that provides a higher thermal resistance than standard white EPS insulation manufactured to CAN/ULC-S701.



Precast Concrete Insulated Wall Panels

Precast concrete insulated wall panels consist of two reinforced or prestressed concrete wythes manufactured with a continuous layer of rigid EPS insulation sandwiched between them. The panels are typically mass-produced in standard widths on long casting beds and will often include an architectural finish on exterior surfaces with a steel form finish on interior faces to create a durable, energy efficient cladding system. Since the interior panel wythe is insulated from the weather it will not be subjected to the extremes of thermal expansion and contraction and will be more stable.

Windows are typically mounted on the interior shell which is more stable. The interior shell acts as a heat source for the window, warming it and allowing for higher relative humidity in the building before condensation occurs on the window.

Precast concrete insulated panels can be constructed so the insulation runs to the vertical edge or a concrete web can be cast as the vertical edge to connect the inner and outer wythes of the panel. The exterior wythe of the precast concrete panel is typically connected to the interior wythe by shear ties that pass through the insulation. Shear ties can be heavy gauge expanded metal, welded wire fabric, rebar, or specially fabricated welded wire trusses. The shear tie is positioned vertically but can be supplemented by horizontal ties. The outer wythe of the panel is isolated from the rest of the building and exposed to the elements so the shear ties are designed to allow movement due to thermal expansion and contraction.

Insulating Precast Concrete Wall Panels

PlastiSpan or *EnerSpan* insulation can also be attached to the interior face of precast concrete panels that do not incorporate insulation after panels have been erected. Plasti-Fab brochure "**Wall Insulation: Interior Systems**" provides typical specifications for insulating concrete walls.