# Plasti-Fab Design Manual

# Frost Protected Shallow Foundations

Plasti·Fab®
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# PlastiSpan®
## Insulation Board

Foundation Application

SPECIFICATION SECTION 7210

PRODUCT CATALOGUE NO. PFH-01

## Frost Protected Shallow Foundation

Plasti-Fab® PlastiSpan® insulation board provides outstanding resistance to moisture and dependable long-term thermal performance when installed on the exterior face of the foundation wall. Insulating the exterior surface of the foundation wall provides the advantage of a fully insulated warm wall, which reduces the likelihood of damage due to freeze thaw and condensation forming on the inner face of the wall.

In colder climates where frost may penetrate to significant depths a Frost Protected Shallow Foundation (FPSF) design may provide significant economic advantages. The use of an FPSF design is a practical alternative to Building Code provisions that require foundations to be placed below the expected depth of frost penetration. FPSF designs using PlastiSpan insulation can be used for either heated or unheated structures where a footing is to be placed above the frost line.

### Attached Garages

**When considered the unheated portion of structure.**

Unless the temperature within an attached garage is maintained above freezing at all times, there is a possibility of the soil beneath the garage foundation wall or floor slab freezing causing frost heave and damage to the garage floor. This is especially true if the sub-soil is a frost susceptible type – e.g., silty clays. For this reason, the recommended design alternative for a typical attached garage, with or without fully insulated above-grade walls, is to treat the garage as an unheated portion of the structure. FPSF design can also be used for small unheated portions of structures such as recessed entries or an entry at grade for a walk out basement.

**When considered part of the heated structure.**

For this type of foundation design the garage foundation wall does not require insulation, although the presence of vertical wall insulation will not be detrimental to the structure. Insulation is placed beneath the wall footing and is required under the entire concrete slab to tie in with the vertical insulation on the heated portion of the structure, the foundation wall of the house. The possibility of a cold bridge between the heated and unheated portions of the structure is thus eliminated. The recommended installation procedure for the PlastiSpan insulation is illustrated in Figure 1.

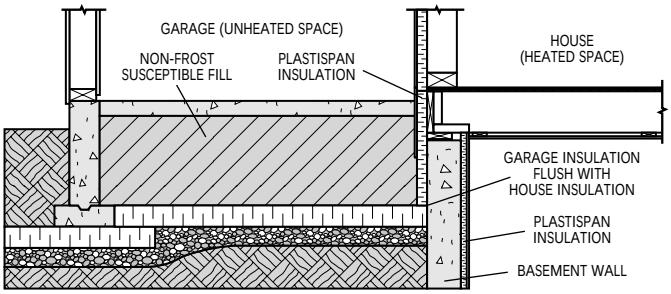


Figure 1. Insulation Detail for Unheated Attached Garage

### Heated Structures

FPSF design procedures may also be used for heated structures, such as houses or an attached garage where the temperature within the structure is maintained above freezing at all times. For this type of FPSF design, vertical insulation is applied to the foundation wall as well as horizontal perimeter insulation around the exterior of the foundation wall. This option does not require insulation under the concrete slab, with the intent that frost would not be permitted to penetrate through the foundation wall into the building enclosure or beneath the footing. The minimum thermal resistance of the vertical insulation must be equal to that of the horizontal insulation.

The width of the insulation in the soil and the height of insulation on the wall below the soil surface combined should, as a minimum, equal the expected depth of frost penetration in the soil **F = C + W**. The insulation must be installed as illustrated in Figure 2.

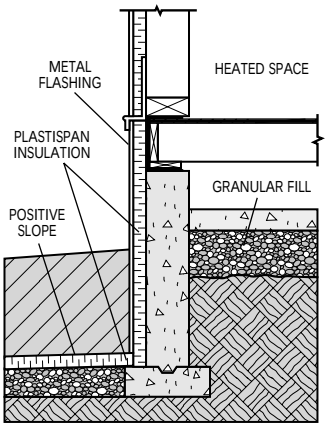


Figure 2. Insulation Detail for Heated Structures

| Depth of Frost Line Below Foundation (D) | Thickness of PlastiSpan Insulation (t) |
|---|---|
| 450 mm (18“) | 25 mm (1“) |
| 900 mm (36“) | 50 mm (2“) |
| 1350 mm (64“) | 75 mm (3“) |
| 1800 mm (72“) | 100 mm (4“) |

## Application

Choose application instructions from the general application instructions *PlastiSpan Foundations – Selection, Application and Specification.* The following specifications apply specifically to shallow foundations.

### Preparation

**Concrete Walls**

Cast nailing strips into the wall in appropriate locations to attach the insulation and the protective finish. Where the header joist is cast into the wall or is placed flush with the surface of the wall the nailing strips may be eliminated. Surfaces to be level, straight, and clean. Remove fins or projections. If surfaces are not straight make good with mortar.

**Concrete Block**

Surfaces are plumb and straight with mortar joints cut flush with masonry. Apply damp proofing to the wall to ground level. Ensure the damp proofing is cured before applying the insulation.

Grade and install the drainage system around the foundation. Cover with gravel leaving the top of the footing clear for the insulation.

**Horizontal Insulation**

Excavate to provide for horizontal width of insulation. Lay 150 mm (6'') sand to provide base for insulation with positive slope away from building.

### Application

**Insulation to Wall**

Starting from a corner install insulation from top of foundation wall to depth required using 1.2 m (4 ft.) wide sheets. Nail insulation to nailer or to header joist using large head insulation nails or galvanized nails with 25 mm (1'') washers. Keep all joints tight. As much as possible use boards placed vertically without a horizontal joint. Where necessary use black mastic adhesive (compatible with expanded polystyrene) applied in 50 mm (2'') diameter gobs on 450mm (18'') centres to hold board in place until backfilling can be completed. Where additional fastening is required use Gripcon Fasteners with 25 mm (1'') galvanized washers.

### Drainage Requirements

Place 100 mm (4'') of gravel against the insulation and over the drainage gravel to tie drainage system to the insulation surface.

**For Horizontal Insulation**

Lay insulation over bed of sand as shown on plans. Backfill with care using soil without large rocks or lumps to avoid damage to the insulation.

### Finish

Attach stucco mesh through to the nailers or to the concrete using Gripcon fasteners with galvanized steel washers. Use galvanized diamond mesh reinforcing at corners or at openings. Extend stucco mesh 300 mm (12'') below expected ground level.

OR

Attach asbestos cement board through the insulation to the nailers using nails or Gripcon fasteners. Extend 300 mm (12'') below expected ground level.

OR

Attach preservative treated plywood through the insulation to the nailers using nails or Gripcon fasteners. Extend 300 mm (12'') below expected ground level. Apply 1/2" (13 mm) parging (2 coats) to the stucco mesh or complete other finishes. Install flashing over top to the insulation and finish so joint with wall finish is water tight. Complete grading so that there is a slope away from the foundation.

## Specification

Choose specification from Specification section *PlastiSpan Foundations – Selection, Application and Specification.*