



# GeoSpan™ Compressible Fill

Plasti-Fab GeoSpan compressible fill material, an expanded polystyrene (EPS) product, is designed to act as a compressible medium reducing potential forces on structures in the event soil expansion occurs after construction is completed. It can be distinguished from other EPS materials not designed for this application, by its brown earth tone colour.

Soil deposits which contain substantial proportions of clay mineral particles can have significant potential for expansion. A soils investigation will identify the extent of soil expansion to be expected.

Soil expansion may affect the performance of structural members, even when pile foundations have been used. The magnitude of soil expansion experienced will depend upon factors such as soil moisture loss during construction and new conditions imposed on the soil as a result of construction (eg., changes in soil stress/temperature induced by the new structure and additional sources of moisture due to landscaping or other factors).

GeoSpan compressible fill material is intended for use as a compressible medium under concrete grade beams, under some structural floor slabs and against foundation walls. GeoSpan compressible fill material is designed to support expected construction live loads and the weight of the structural slab, until the concrete has cured and gained enough strength to be self-supporting.

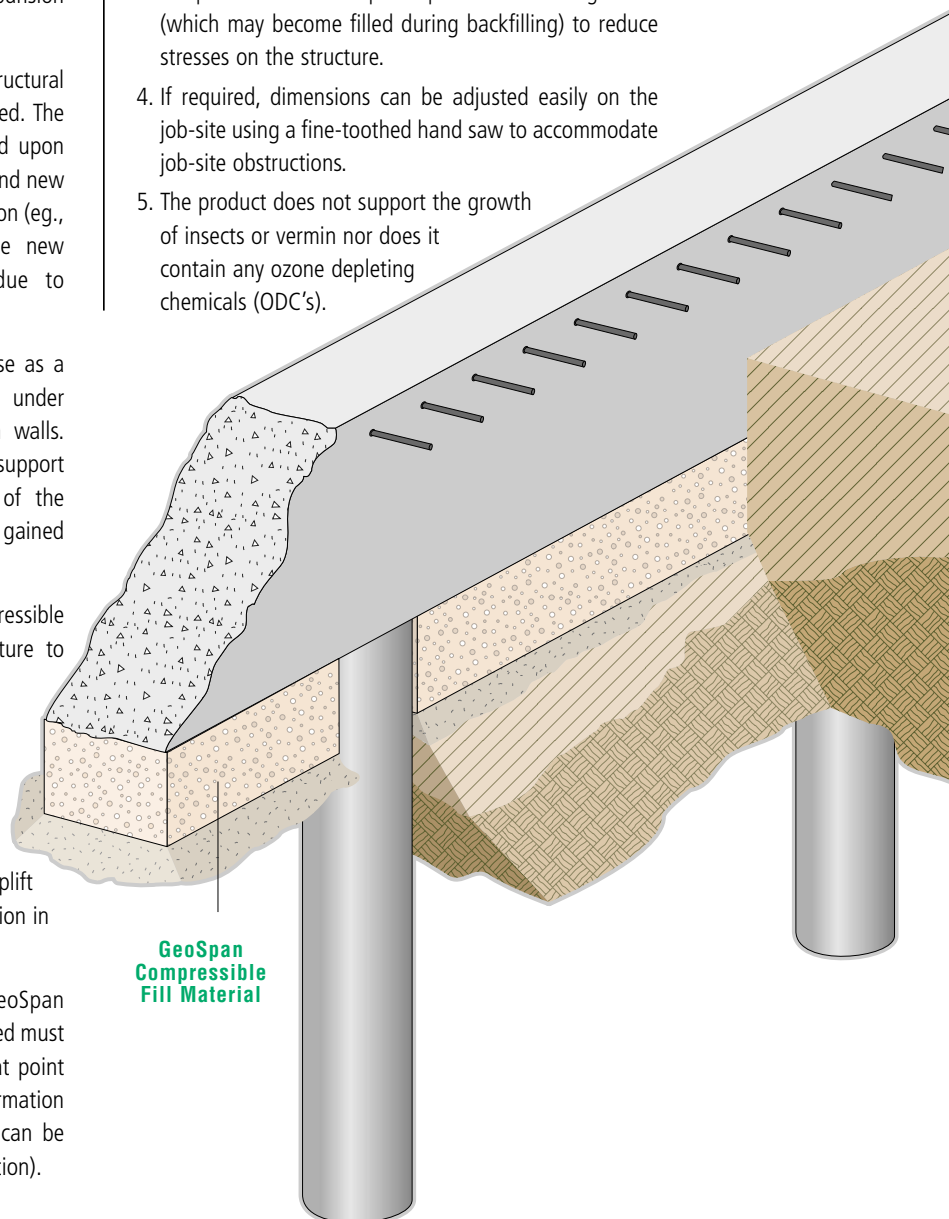
GeoSpan compressible fill material acts as a compressible medium between the expansive soil and the structure to reduce long-term stresses transferred to the structure. The structure must be restrained from movement in the direction of soil expansion and designed to withstand long-term compressive stresses transferred through the compressible medium. On the long term, the compressible medium is designed to compress in the event of soil swell without exceeding the design uplift capacity of the structure (see the 'Design Criteria' section in this brochure).

If reinforcing is to be supported directly on GeoSpan compressible fill material, reinforcing support chairs used must be of a type, and in sufficient quantity, to ensure that point loads do not exceed 10 kPa (1.4 psi). Normally, deformation due to the initial weight of freshly placed concrete can be ignored (see graph of Compressive Stress vs. Deformation).

## Advantages

Some of the advantages of GeoSpan compressible fill material are:

1. As an engineered product it is designed to meet specific requirements for each application.
2. The engineered properties of the product are not affected by the presence of water.
3. The product does not depend upon a voided configuration (which may become filled during backfilling) to reduce stresses on the structure.
4. If required, dimensions can be adjusted easily on the job-site using a fine-toothed hand saw to accommodate job-site obstructions.
5. The product does not support the growth of insects or vermin nor does it contain any ozone depleting chemicals (ODC's).



## Application

### Design Criteria

GeoSpan compressible fill material is supplied to the customer pre-cut to the required dimensions. The standard length is 2440 mm (96"). Required dimensions for width up to 1220 mm (48") and thickness up to 610 mm (24") are provided to job specifications.

The required thickness of GeoSpan compressible fill material is determined based upon the following criteria:

- Self-weight the structure temporarily supported
- Net structural uplift resistance capacity of the structure
- Maximum GeoSpan compressive strength (U)
- Maximum anticipated soil swell (E)

### Notes

1. Maximum GeoSpan compressive stress (U) is equal to the maximum compressive stress anticipated on the long term after compression induced by soil swell.
2. The net structural uplift load is the maximum GeoSpan compressive stress less the self-weight of the structure.
3. The GeoSpan final strain (D) is determined from the graph of compressive stress versus deformation provided based upon the maximum GeoSpan compressive stress (U).
4. The required thickness (T) of GeoSpan compressible fill material is then calculated using the following formula:

$$T = \frac{E \times 100}{D}$$

## Specification

Section 3300, Cast-In-Place Concrete.

### PART 2: PRODUCTS

#### Materials

GeoSpan compressible fill material, manufactured by Plasti-Fab, in dimensions specified on drawings to conform to the requirements of the project engineer.

### Design Example

The thickness of GeoSpan compressible fill material required under a 750 mm grade beam can be determined as follows:

- Self-weight of structure temporarily supported = 18 kPa
- Net structural uplift resistance capacity of the structure = 32 kPa
- Maximum GeoSpan compressive strength (U) = 50 kPa
- Maximum anticipated soil swell (E) = 50 mm

From the graph of Compressive Strength (U) vs. % Deformation (D) provided, the value of D at the maximum allowable stress transfer is equal 50%. GeoSpan required thickness (T) is calculated as follows:

$$T = \frac{50 \times 100}{50} = 100 \text{ mm}$$

### Quality Control Testing

Designers are cautioned that GeoSpan compressible fill material utilizes different manufacturing and testing criteria than standard EPS insulation board in order to obtain the engineered properties necessary for this application. The physical properties of GeoSpan compressible fill material are controlled within close tolerances during manufacture.

