



[home](#) | [about us](#) | [products](#) | [technical](#) | [site map](#)



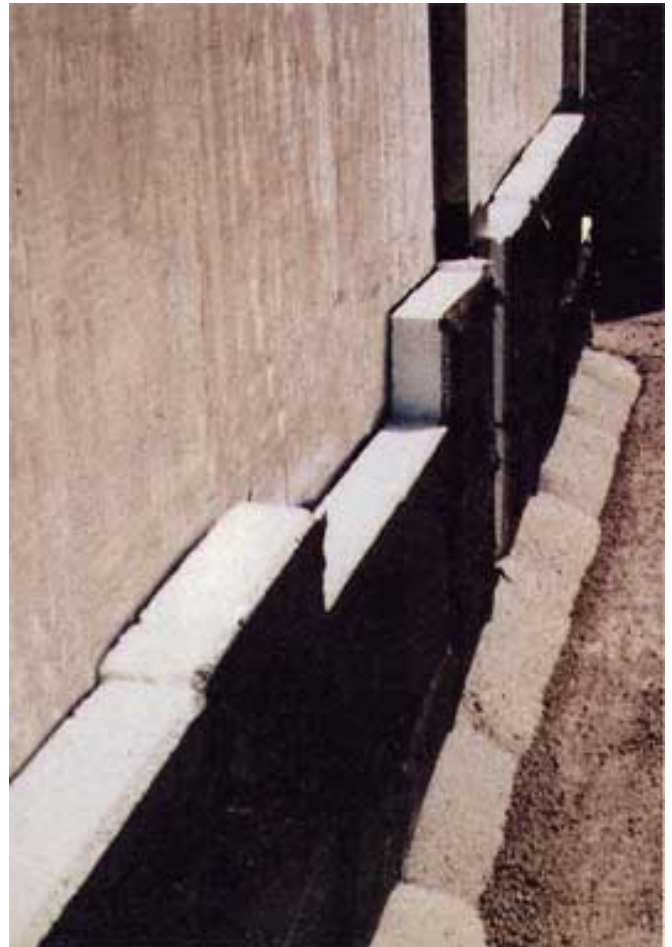
*The GeoInclusion® is used in compressible inclusion and hydrostatic pressure relief applications on structural elements such as:*

**Retaining walls**

**bridge abutments**

**foundation walls**

The GeoTech GeoInclusion® is a unique, patented geosynthetic product that can simultaneously provide the functions of compressible inclusion, thermal insulation and drainage. The GeoTech GeoInclusion® is innovative in its ability to deform under load in a controlled, predictable fashion.



The GeoInclusion® is used in compressible inclusion applications where a strong yet lightweight material is required to reduce stresses and provide fluid drainage on structural elements.

When placed between earth materials and a structure, the GeoTech GeoInclusion® offers distinct cost and performance benefits over alternatives.

Earth pressure is reduced because the GeoInclusion® compresses with relatively little resistance under:

- the gravity stress of the retained soil,
- the expansion of swelling soils, rock, or freezing soils,
- the inertial loading of large scale events such as earthquakes or blasts.

Hydrostatic pressure and gases, such as radon or methane, are relieved when the GeoInclusion® is part of a hydrostatic pressure relief or gas venting system. Water and gases are vented through the drainage composite portion of the GeoInclusion.

Quality of below grade space is improved through the GeoInclusion's thermal insulating characteristics resulting in:

- lower heating costs,
- reduced dehumidification costs because the dew point is moved to outside the below grade space.



The GeoInclusion® provides superior earth vibration damping from seismic activity and road and rail traffic. Sound vibration damping is reduced both from or into below grade spaces.

The GeoInclusion® is environmentally friendly:

- It is chemically and biologically inert.
- It is a permanent filler between earth materials and the structure.
- There is no negative environmental impact on earth materials or ground water.

Exposed retaining walls perform better:

- Thermal insulation can prevent freezing of the retained soil. Stresses associated with expansion during freezing are absorbed by the Geoinclusion.
- With a polymeric reinforcement located in the retained soil, thermal insulation can reduce creep of the reinforcement which results when the soil is heated by solar radiation on the face of the wall.
- Long term structural and thermal performance is assured by the incorporation of Perform Guard®.\* Perform Guard is made under a patented process\*\* which uses a natural mineral additive to make EPS insect resistant.

*\*Tested against termites and carpenter ants. Manufacturer has specific species on file. Perform Guard is a registered trademark of the AFM Corporation.*

*\*\*Protected under U.S. Patents No. 5,194,323 and No. 5,720,108. Other U.S. and Foreign Patents Pending.  
©1997 AFM Corporation*

**Composition and Materials:** The GeoTech Geoinclusion® consists of a rectangular panel of GeoTech TerraLite™ or TerraFlex™ Elasticised Geofoam laminated to a GeoTech Insulated Drainage Panel which combines a drainage medium and a geotextile.

Standard panel dimensions are 1219 mm (4 feet) wide by 1219 mm (4 feet) long with the thickness dependent on specific project requirements. Other panel shapes and dimensions can be produced on a special order basis.

The material used for the EPS-block component may be either GeoTech TerraLite™ or TerraFlex™ depending on project specific requirements.



The GeoTech TerraLite™ has a nominal density of 12 kg/m<sup>3</sup> (0.75 lb./ft.<sup>3</sup>) to 32 kg/m<sup>3</sup> (2.00 lb./ft.<sup>3</sup>). Refer to the [TerraLite™](#) product literature for more specific information.

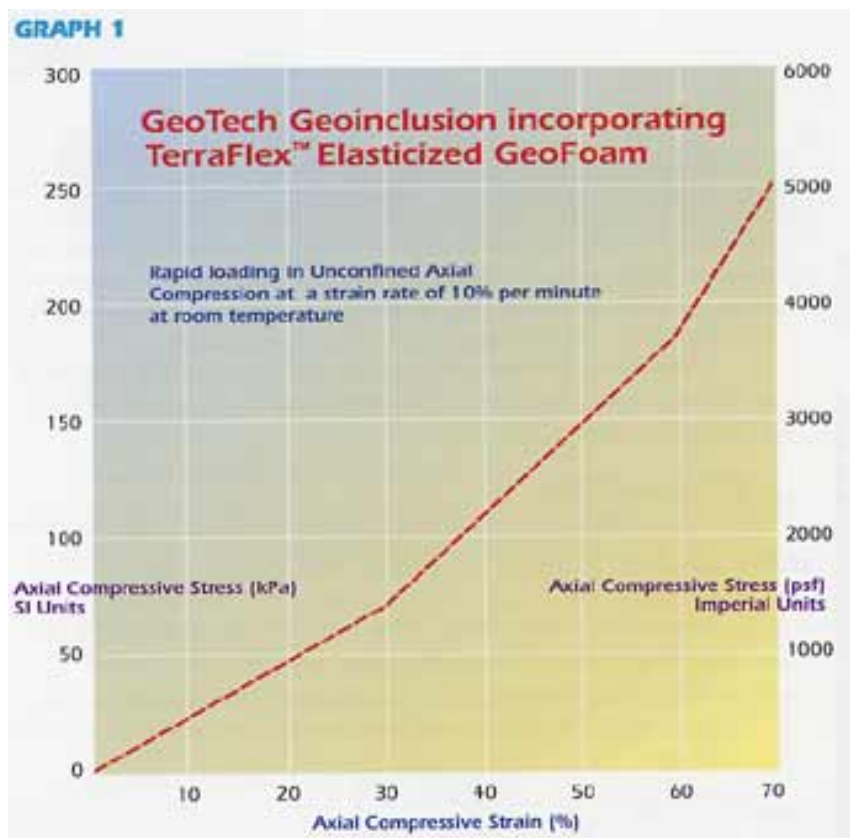
TerraFlex™ Elasticized Geofoam can also be used as a component of the Geoinclusion. The TerraFlex™ configuration has increased compressibility under stresses of relatively small magnitude compared to the TerraLite™ Geofoam. Refer to the [TerraFlex™](#) product literature for more specific information.

Details concerning the general thermal properties of the the GeoTech TerraLite™ family of products and the capabilities of the GeoTech Insulated Drainage Panel are available separately.

**Technical Data:** To select the required thickness of the geofoam, the design professional should develop project-specific design curves relating deformation of the ground surface and stress at the ground surface from the expanding soil. In general, the largest stress occurs under confined (zero deformation) conditions and the largest deformation occurs under free-swell (zero stress) conditions. The designer must select a magnitude of surface stress and corresponding deformation that is intermediate to these limiting conditions and for which the structure will be designed.

*Note: In the absence of data relating to surface stress and deformation, the designer can use deformations*

estimated using free-swell tests and arbitrarily select a stress level for which the structure will be designed.



Graph 1 shows the stress-strain relationship of TerraFlex™ Elasticized Geofoam in rapid loading, unconfined axial compression at a strain rate of 10% per minute at room temperature. To determine the thickness of TerraFlex™ required for project specific conditions Graph 1 is used to estimate the strain level in the Geofoam.

1. Find the stress magnitude for which the structure will be designed on the vertical axis.
2. Move horizontally to the appropriate stress-strain curve. For the most conservative design, the rapid loading curve should be used. For greater economy under conditions when the ground expansion is expected to develop over an extended period of time, one of the extended time curves in Graph 2 can be used. For geofoam strains greater than approximately 40%, only the rapid loading curve should be used.
3. Move vertically downward and scale off the corresponding Geofoam strain level.

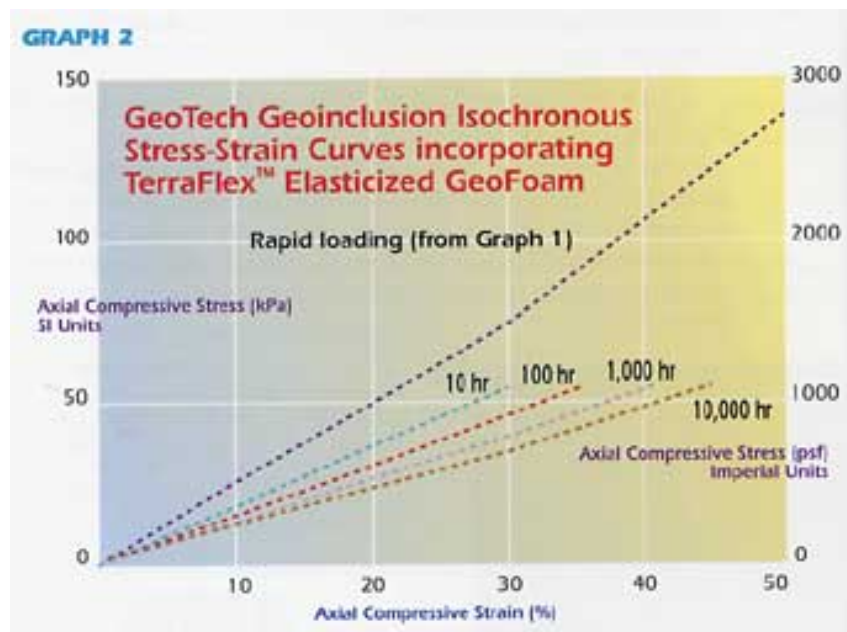
The required thickness of Geofoam is the calculated using the following equation:

<b>Geofoam Thickness</b>	<b>(Design magnitude of surface deformation x 100)</b>
<b>=</b>	<b>Geofoam strain (in %)</b>

Using this simple approach, different combinations of stress transmitted to the structure and Geofoam thickness can be evaluated to find the most cost effective design.

**Graph 2 shows isochronous stress - strain curves for different durations of loading for TerraFlex™ Geofoam.**

The stress-strain curves were developed using the results of unconfined axial compression creep tests.



**Installation:** For most applications, the Geoinclusion® is installed in accordance with the following guidelines. Additional guidelines for specific applications should be developed by the design engineer.



1. Surfaces should be clean, dry and sound; free of excessive dust, dirt, loose paint, oil, and grease or any foreign matter that would interfere with a good bond.
2. When applying over waterproofing or dampproofing materials, check to determine compatibility. Be sure concrete and waterproofing materials are well cured and dry.
3. Apply OSI QB-300 (or equal) adhesive to the EPS side of the Geoinclusion. Place walnut sized daubs of adhesive alternately spaced every 8" - 12" apart across the surface of the Geoinclusion® board, beginning 3" from the edges.
4. Press panels firmly against wall surfaces, making sure vertical joints are staggered and all joints are butted tightly.
5. Panels are furnished with a 2" minimum fabric lap on two adjacent edges. Install panels so that all joints are completely covered by geotextile fabric, making sure that fabric side faces the earth. Begin first row with fabric lap at the bottom. The adjacent side lap will then be in the left vertical position. Additional spot-gluing of fabric joints may be necessary during backfill operations to insure complete masking of joints.

**Availability and Cost:** Cost is directly related to the thickness of the material. Please contact GeoTech Systems Corporation to determine current material cost. The GeoTech Geoinclusion® is available throughout the United States, Canada and Puerto Rico.

**Maintenance:** Under normal conditions of use, the GeoTech Geoinclusion® requires no maintenance for the life of the system.

**Technical Services:** Complete technical services are



available from GeoTech Systems Corporation and its licensed manufacturers or distributors. Services include assistance during the design and specifications stages. Sales representatives can also work with the contractor through the initial stages of application to assure proper installation.

**The Manufacturer:** GeoTech Systems Corporation was founded in 1982 to provide state of the art solutions to the waterproofing, drainage, structural and insulating challenges associated with below grade construction.

NOTICE: The information contained herein is, to the best of GeoTech's knowledge, accurate and reliable as of August 1998. Freedom from patents of GeoTech or others is not to be inferred. For any information that may have been developed subsequent to August 1998, consult the nearest GeoTech sales office.

[home](#) | [about us](#) | [products](#) | [technical](#) | [site map](#)



**GeoTech Systems Corporation**  
PO Box 1045  
Great Falls, VA 22066

(v) 703 759 0300  
(f) 703 757 0119  
(e) [info@geosyscorp.com](mailto:info@geosyscorp.com)

*Last Modified: September 4, 2004*