



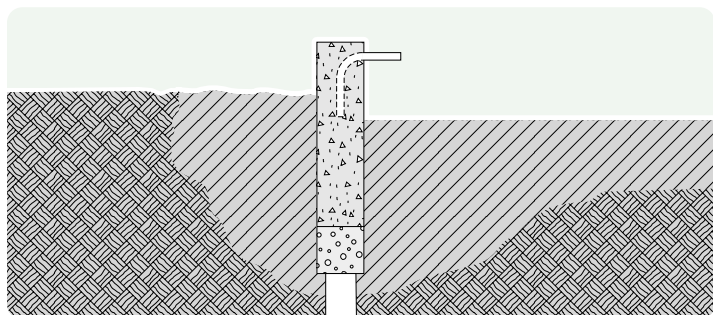
PlastiSpan™ Insulation

Geotechnical Engineered Applications Selection, Application and Specification

This brochure provides design notes, application instructions and specifications applicable to PlastiSpan building insulation for foundation applications. The required installation method varies dependent upon the membrane to be applied above the

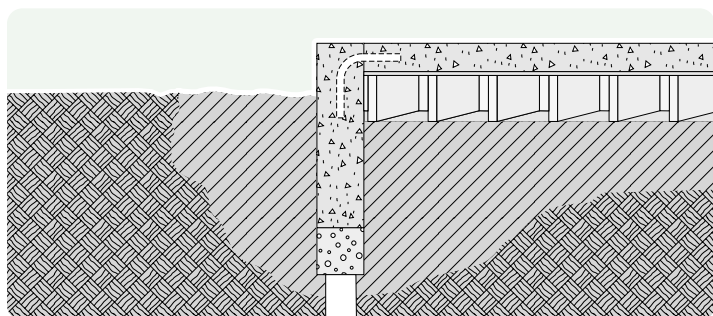
insulation. The selection chart below indicates additional brochures, which should be reviewed for complete information on the use of PlastiSpan insulation for foundation applications.

GeoSpan™ Compressible Fill Material



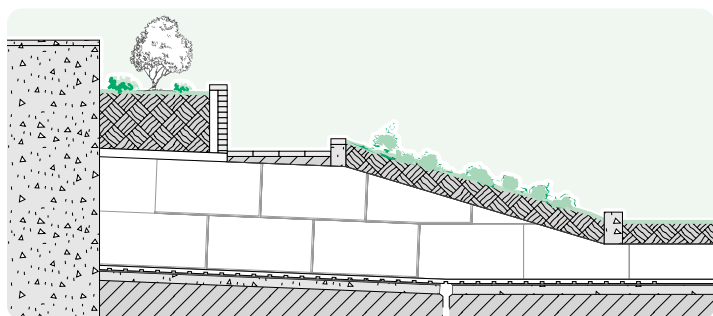
- Used beneath structural grade beams
- Prevents damage to structure due to expansive soil

GeoVoid™ Compressible Fill Material



- Used beneath structural concrete slabs
- Prevents damage to structure due to expansive soil

GeoSpec™ Lightweight Fill Material



- Lightweight fill material less than 1/100th weight of soil backfill materials
- Reduces structural load
- Excellent resistance to water absorption

Design Notes

Topics discussed in these design notes include the use of compressible fill materials to reduce loads on structures caused by expansive soils and lightweight fill materials for landscape void applications. Plasti-Fab expanded polystyrene (EPS) products are suitable for all of these applications.

Energy conservation studies have identified that substantial heat losses occur from the foundations of buildings. When considering the viability of foundation insulation, the cost of energy has to be considered along with the comfort requirements of the building occupants. Another factor that is often ignored is the added durability of a properly insulated structure as a result of avoiding condensation and freeze-thaw conditions.

The application of insulation externally to a building foundation provides several beneficial effects. It allows for a monolithic insulation layer. As well, the mass of the foundation wall is inside the insulation, which reduces temperature fluctuation inside the building, condensation and freeze-thaw conditions. The insulation is required to be in contact with the soil and must be capable of retaining its insulation properties in this service.

Plasti-Fab EPS products are suitable and recommended for use in contact with the ground. They are lightweight, easy to handle rigid foam plastic insulation materials. Their closed cell structure assures long term durability. PlastiSpan insulation is inert to a wide range of chemicals, has no food value and will not support the growth of insects, parasites, animal or plant life.

Plasti-Fab EPS products have been used successfully for over thirty years in contact with the soil. Technical publications from

independent research bodies detailing performance over a thirty-year period are now available to confirm long-term performance.

Adhesives

Adhesives can be used to bond the insulation in place on a concrete or concrete block wall and may also be used to provide an air or vapour barrier for the wall system. PlastiSpan insulation will deteriorate when in contact with petroleum solvents used to formulate many adhesives. Therefore, any adhesive used in contact with PlastiSpan insulation must be recommended by the adhesive manufacturer for use with foam plastic insulation.

Fasteners

A number of patented fasteners can be used to fasten insulation. Typically, the fasteners require a pilot hole to be drilled through the insulation and substrate with a fastener screwed or hammered into the hole.

When a fastener is used to hold the insulation in place it is used with a 25 mm (1") outside diameter prepunched fibre washer under the head to provide a larger bearing surface for the fastener.

Concrete Fasteners

Concrete fasteners are also suitable for many applications. Concrete fasteners are designed to fasten a nailer, strap, or bracket onto concrete or masonry walls. A close tolerance carbide drill bit is used with a hammer drill to make a pilot hole into the concrete or masonry. The concrete fastener is driven into the pilot hole with a hammer to provide quick and easy attachment. Minimum embedment of 25 mm (1") is recommended.

Specifications

This specification consolidates essential information about Plasti-Fab PlastiSpan insulation product for specifiers and other professionals involved in a construction project. The 10-part specification conforms to the editorial style of Construction Specifications Canada.

Part 1 – General

Product Name

GeoSpec Lightweight Fill Material.

Product Type

Moulded expanded polystyrene (EPS).

Part 2 – Manufacturer

Plasti-Fab Ltd.

Contact Information:

Toll-free Number: 1-888-446-5377

E-mail: mailbox@plastifab.com

Website: www.plastifab.com

Part 3 – Product Description

Description

GeoSpec lightweight fill material is a geofoam material manufactured from moulded expanded polystyrene (EPS) product that does not contain any CFCs, HFCs or HCFCs.

Basic Use

GeoSpec lightweight fill material is a geofoam product used in projects involving roads, bridge approach fills, embankments, levees, berms, foundations, landscaping, etc., worldwide for over 40 years. It is a rigid cellular plastic material that is strong, but has very low density (less than 1% of traditional earth materials). It can be manufactured to meet a wide range of geotechnical engineering specifications with a typical density range from 11 kg/m³ (0.7 pcf) to 32 kg/m³ (2 pcf) providing a range of mechanical properties. GeoSpec fill material type is typically specified based upon the required compressive resistance properties for a specific project.

Specifications

GeoSpec fill material offers the following benefits to maximize onsite installation efficiency:

- Material arrives ready to place, no weather delays.
- Material can be prefabricated or cut at the jobsite, no staging required.
- Material can be inventoried, improving production efficiency.
- Lightweight product, easy to handle.

Composition and Materials

GeoSpec lightweight fill material is inert, non-nutritive and highly stable, and will not decompose, decay or produce undesirable gases or leachates. It is lightweight, rigid and easy to handle, and the closed-cell structure assures resistance to absorption of moisture.

Typical Product Sizes

Standard block sizes are 1220 mm (4 ft) wide by 2440 to 4880 mm (8 to 16 ft) long by varying height up to 1300 mm (51"). Product densities and block sizes available in various Plasti-Fab locations across Canada should be confirmed with the local sales office.

Limitations

- Plastic foam products, such as GeoSpec lightweight fill material, are combustible, and although a chemical additive to inhibit accidental ignition is present, the product should not be exposed to a large, continuous fire source.
- The continuous service temperature limit of PlastiSpan insulation is 70 °C (160°F). Constant exposure to temperatures above 72 °C (170°F) will shrink and warp the product.
- Petroleum products will cause EPS foam products to soften and collapse, and attention should be given to the selection of adhesives, coatings and separation sheets.
- Geofoam must be protected from direct sunlight by covering with a tarpaulin or opaque, light-coloured polyethylene film.

Part 4 – Technical Data

Applicable Standards

ASTM INTERNATIONAL (ASTM)

- ASTM C 203-99, Standard Test Method for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
- ASTM D 1621-00, Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- ASTM D 2126-99, Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
- ASTM D 2842-01, Standard Test Method for Water Absorption of Rigid Cellular Plastics.
- ASTM D 2863-00, Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index).
- ASTM E 84-01, Standard Test Method for Surface Burning Characteristics of Building Materials.

CANADIAN GENERAL STANDARDS BOARD (CGSB)

- CGSB 71-GP-24M, Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation.

UNDERWRITERS' LABORATORIES OF CANADA (ULC)

- CAN/ULC-S102.2, Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials.
- CAN/ULC-S107, Fire Tests of Roof Coverings.
- CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

Environmental Considerations

EPS products contain no HFC's, HCFCs or formaldehyde, are highly stable, will not produce any undesirable gases or leachates, and are recyclable where facilities exist.

Physical/Chemical Properties

- Compressive strength @ 10% deformation when test using ASTM D 1621):
 - Type 1:** 70 kPa (10 psi)
 - Type 2:** 110 kPa (16 psi)
 - Type 3:** 140 kPa (20 psi)
- Flexural strength when test using ASTM C 203 – Procedure B:
 - Type 1:** 170 kPa (25 psi)
 - Type 2:** 240 kPa (35 psi)
 - Type 3:** 300 kPa (44 psi)
- Water absorption (to ASTM D 2842):
 - Type 1:** 6% by volume
 - Type 2:** 4% by volume.
 - Type 3:** 2% by volume.
- Dimensional stability – 7 days @ 21°C ± 2°C (71.6 ± 1.8°F) when test using ASTM D 2126:
 - 1.5% linear change for Types 1, 2 and 3.
- Compressive modulus when test using ASTM D 1621:
 - Type 1:** 2375 kPa (344 psi)
 - Type 2:** 4900 kPa (710 psi).
 - Type 3:** 7100 kPa (1030 psi).
- Limiting oxygen index when test using ASTM D 2863:
 - minimum 24% for Types 1, 2 and 3.
- Flame Spread when test using CAN/ULC-S102.2:
 - 290 for Types 1, 2 and 3.
- Smoke developed when test using CAN/ULC-S102.2:
 - >500 for thicknesses from 25 mm to 100 mm (1" to 4") for Types 1, 2 and 3.

Specifications Notes

Part 5 – Installation

Preparatory Work

Handle, store and protect boards in accordance with Plasti-Fab recommendations. Ensure product is protected from direct sunlight with tarpaulins or light-coloured polyethylene sheets, and secure against movement from wind storms at the storage location. Handle blocks carefully so corners are not broken off or otherwise damaged.

Methods of Application

Installation methods vary with specific applications. General construction principles can be found in Plasti-Fab Technical Bulletin 117-08.

Precautions

Plastic foam products, such as GeoSpec lightweight fill material, are combustible and should be treated with normal care accorded to all combustible materials. Although treated with a fire-retardant chemical, ignition will occur if exposed to a continuous fire source. Avoid open flames, welding torches and high intensity lamps, and if welding is necessary in proximity to the EPS board, protect the insulation with fire-rated gypsum board or similar products.

Part 6 – Availability and Cost

Availability

Plasti-Fab is headquartered in Calgary, Alberta, Canada and has been serving customers in Canada and the US from six Canadian manufacturing facilities, for over 30 years. Contact Plasti-Fab using any of the methods listed in Part 2 of this specification for current list of facilities and agents.

Cost

Contact Plasti-Fab using any of the methods listed in Part 2 of this specification for current pricing information. Cost information may also be obtained from a local Plasti-Fab dealer.

Part 7 – Warranty

It is the responsibility of the contractor to install GeoSpec lightweight fill material in accordance with Plasti-Fab published recommendations. Plasti-Fab assumes no liability resulting from a failure to follow these instructions. Plasti-Fab liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to the manufacturer within 30 days from the date it was, or reasonably should have been, discovered. Further information on warranty conditions, duration and remedies may be obtained from Plasti-Fab.

Part 8 – Maintenance

GeoSpec lightweight fill materials are maintenance free when installed according to Plasti-Fab's published recommendations.

Part 9 – Technical Services

Plasti-Fab's broad distribution network ensures exceptional customer service. One of the most comprehensive design manuals in the industry is available to assist engineers, architects and specification writers to determine how to make the best use of EPS. For more information, contact Plasti-Fab using any of the methods listed in Part 2 of this specification.