



EPS Geofill - Civil Engineering

Stylite EPS Geofill is a lightweight, cellular plastic alternative to traditional fill materials such as soil or concrete. Manufactured off site it gives you the greatest possible control of your Civil Engineering project enabling you to design for key geosynthetic functions. Inherently multi-functional, Stylite EPS Geofill can be used in a wide range of Civil Engineering applications such as Earthworks & Structural Fill, Transportation and Architectural.

NBS Plus - Specification

Please visit our website for NBS Plus specifications and clauses www.styrene.biz

Key Benefits

- Lightweight compared to other fills
- High compressive strength
- Easy to install and cut on-site
- Lower overall cost of construction
- Reduced loads on underlying ground
- Reduced construction programmes
- Available in standard or bespoke blocks
- Minimal water absorption & permeability
- Resistant to rot & durable
- 100% recyclable
- No HFC's, CFC's or HCFC's

Design Considerations

With so many benefits for the use of EPS in civil engineering applications, specifiers of Stylite EPS Geofill must consider the following engineering properties and construction factors to ensure a successful project design.



Safety - EPS Geofill is non-toxic, chemically inert, non-irritant and odourless making it entirely safe to use across all construction applications. These attributes help reduce on-site health and safety issues and concerns compared to alternative materials.



Sustainability - Offering exceptional sustainability credentials EPS contains no CFC's or HCFC's. It has Zero Ozone Depletion Potential and a low Global Warming Potential whilst also being 100% recyclable at many stages of its life cycle.



Lightweight - EPS Geofill is approximately 1% the weight of soil and less than 10% the weight of other lightweight fill alternatives. As a result EPS Geofill reduces the loads and lateral stresses imposed on adjacent and underlying soils, structures and utilities.



Fire Classification - EPS Geofill is available with a Flame Retardant Additive (FRA) included during the manufacturing process. When a FRA is included the classification for reaction to fire is Euroclass E For standard non fire retardant EPS the classification is



Compressive Strength - EPS Geofill is available in a range of densities to provide options for specifiers who must consider the maximum loadings that will be imposed on their particular Civil Engineering Application.



Water Absorption - EPS Geofill has a closed cell structure which means it limits water absorption to minimal levels. When used in well-drained applications, no change in weight occurs, if installed in a submerged application EPS will have a negligible increase in the overall weight.

Loadings & Grade Selector

EPS Geofill	Service Limit State Permanent Load (kPa)	Service Limit State Cyclic Load (kPa)
EPS 70	21	24
EPS 100	30	35
EPS 150	45	52
EPS 200	60	70
EPS 250	75	87
EPS 300	90	105

Maximum Loadings - When designing for projects using EPS Geofill, engineers must consider the maximum permanent or cyclic loads that will be imposed.

The table opposite shows the maximum load values which should not be exceeded for each grade of EPS. Please note a safety factor may be applied to these load figures if required.

Design Considerations



Construction Cost - Lower installation costs and savings from being able to specify less robust adjoining structures, due to the reduced loads imposed by EPS Geofill, provides significant project cost savings. Minor settlement of EPS also leads to lower life cycle maintenance costs.



Ease of Handling - EPS Geofill blocks are easily carried and installed manually on-site without the need for specialist equipment or skills. This is an important consideration on restricted access sites where large earth moving and compaction equipment would be needed to install traditional fill materials.



Durability - EPS Geofill is a durable and rot proof material which will remain effective for the life of any civil engineering application. Fungi and bacteria cannot grow on EPS and offers no nutrient attraction to insects or vermin.



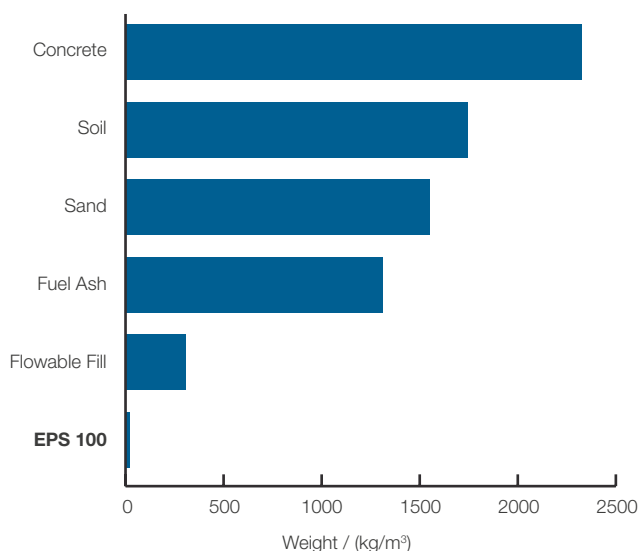
Thermal Insulation - Most lightweight void fill applications will not have a requirement for thermal insulation. Nevertheless EPS Geofill provides an excellent level of insulation which should be considered during the design stage.



Chemical Exposure - If EPS Geofill is being installed in an area with contaminated soils a suitable geomembrane should be specified to prevent certain hydrocarbon chemicals coming into contact with the EPS and damaging it. See our website for more information about how EPS reacts with different chemicals.



Construction Time - The speed and time to install EPS Geofill is far quicker than traditional fill methods and is not affected by adverse weather conditions. This helps contractors plan effectively and then maintain project programme deadlines.

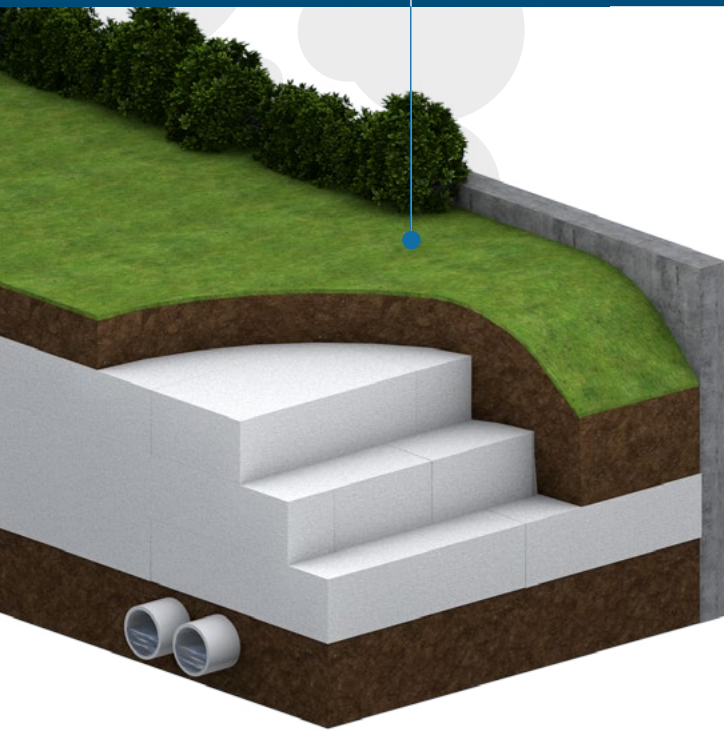


Weight Comparison

EPS Geofill v Traditional Fill - Construction materials can be very heavy which leads to high transport costs and high related carbon emissions. Traditional fill materials also exert high earth pressures to adjacent and underlying soils, structures and utilities.

In contrast EPS Geofill is approximately 1% the weight of soil thereby allowing large savings in the transport costs and carbon footprint. Less concrete in the overall project is required when using EPS Geofill due to the reduced structural requirements which again saves money.

YourSpreadsheets.co.uk for Architects, Contractors, Civil & Structural Engineers
Gov.UK Specification for the reinstatement of openings in highways



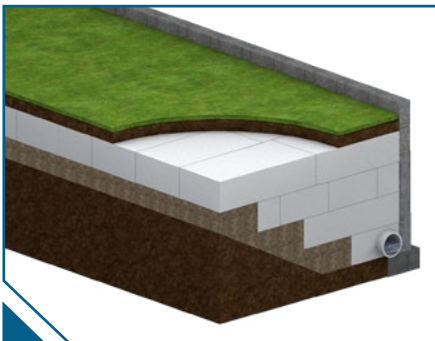
Earthworks & Structural Fill

Typical Applications :

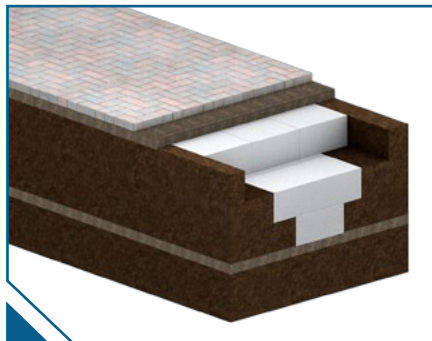
- Retaining Walls
- Compensating Foundation
- Landscaping
- Lightweight Voidfill
- Bridge Abutments
- Pipelines & Culverts

Earthworks & Structural Fill

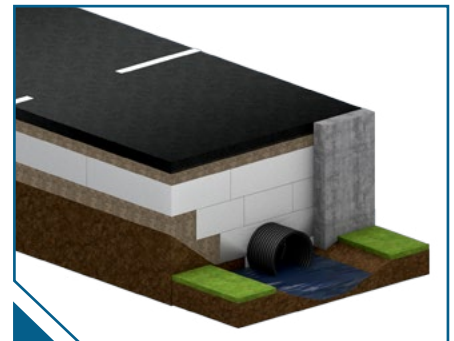
The use of EPS Geofill in earthworks and structural fill applications provides the benefit of reducing both vertical and lateral pressures on the ground below and adjacent structures. EPS Geofill is easy to install, does not require surcharging, pre-loading or staging and is a cost-effective engineering solution.



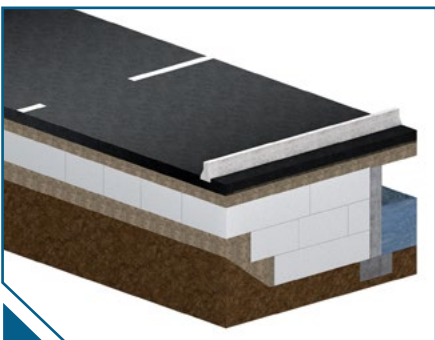
Retaining Walls - Reduce lateral pressures caused by loose backfill.



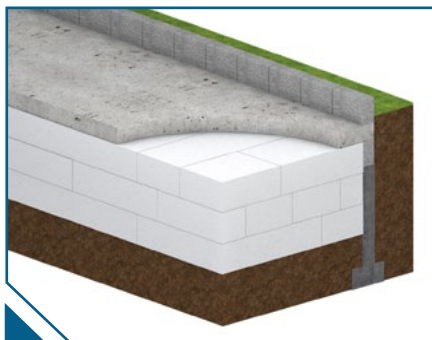
Lightweight Voidfill - No compaction or heavy equipment required.



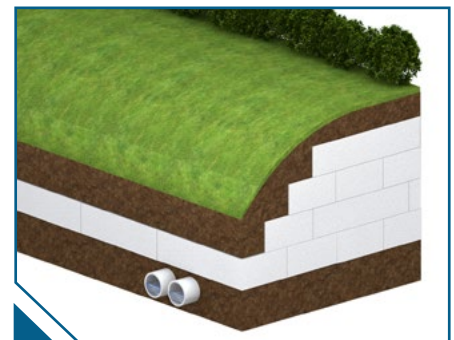
Pipelines & Culverts - Reduce loads on existing underground structures.



Bridge Abutments - Compressive strength able to support industrial / traffic loadings.



Compensating Foundations - Reduce loads on underlying substrates like soil / silt.



Landscaping - Create topography without adding load to underlying structures.



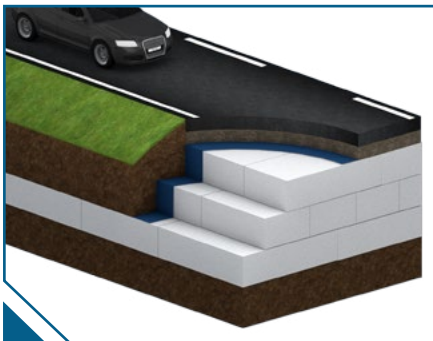
Transportation

Typical Applications :

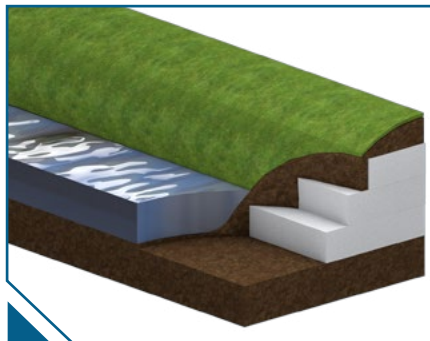
- Road Construction
- Rail Embankments
- Bridge Infilling
- Airport Runways
- River Embankments
- Ramps

Transportation

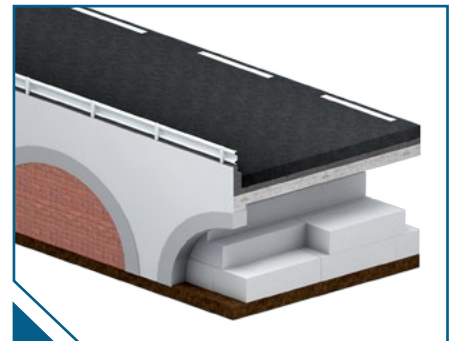
The use of EPS Geofill in transportation applications provides the benefit of excellent compressive strength and minimal long term compression where loads are permanent or cyclic. EPS Geofill is quick and easy to install, does not require staged construction and is a cost-effective alternative to traditional fill materials.



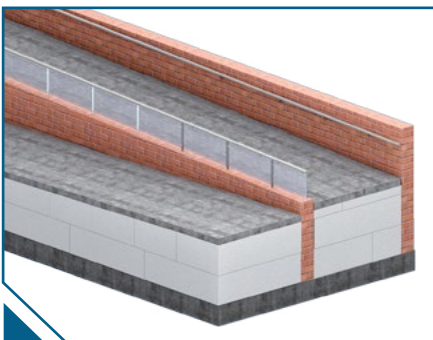
Road Construction - Compressive strength able to support high traffic.



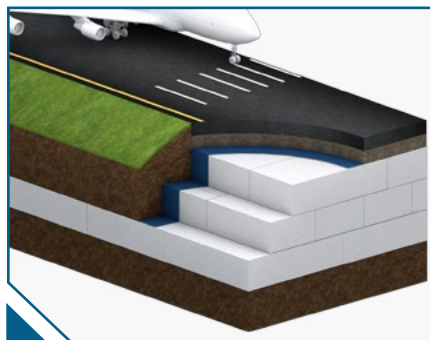
River Embankments - Reduce settlement and embankment raising.



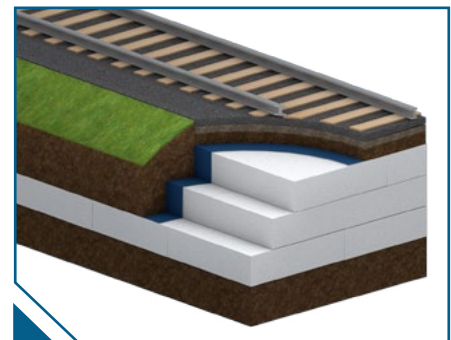
Bridge Infilling - Support the span and transfer the traffic load to the foundation.



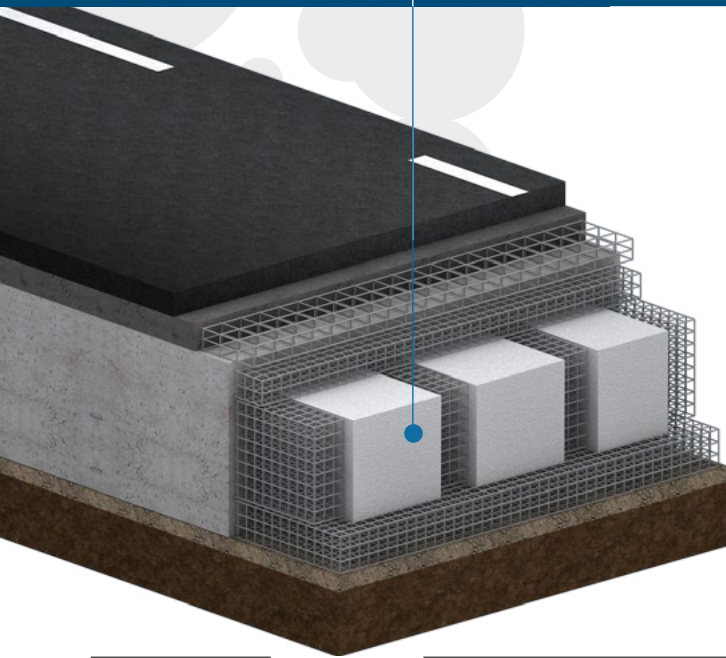
Ramps - Produce sloping ramps in the construction of car parks or for temporary access.



Airport Runways - Prevent differential settlement on new or refurbished runways.



Rail Embankments - Lightweight yet strong enough to support railway loads with no settlement.



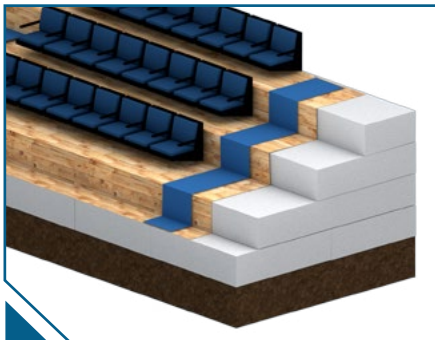
Architectural

Typical Applications :

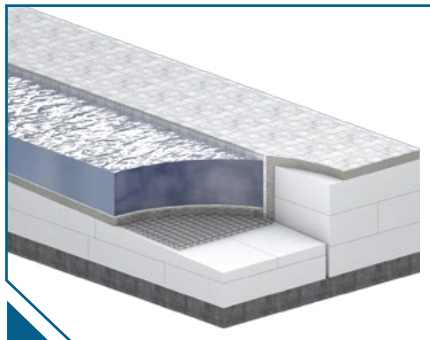
- **Cinema & Stadium Seating**
- **Pool & Pool Decks**
- **Concrete Forming**
- **Green Roof Gardens**

Architectural

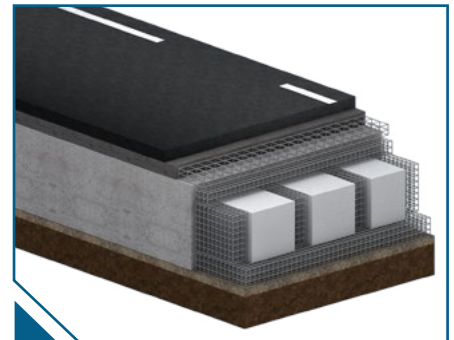
The use of EPS Geofill in architectural applications provides the benefit of being a strong but lightweight material. Easy cutting allows the on-site preparation of complex shapes to match the most demanding architectural and design requirements making it the preferred material of choice.



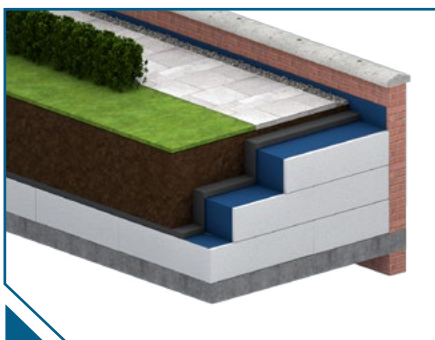
Cinema & Stadium Seating - Custom made for each specific application for a perfect fit.



Pool & Pool Decks - Cut to fall design creates the slope while deck areas can be raised.



Concrete Forming - Reduce dead loads by creating a void or fill within concrete structures.



Green Roof Gardens - Create vegetative roofs, with topography and extra insulation value.

EPS Geofill Typical Installation Guide

For applications with soil ground

Preparation

Clear and grub the site and if required excavate ground to the necessary depth. As per the design engineers drawings place a geomembrane over the graded surface.

Drain any site water as required and place a sand levelling course over the prepared surface to a minimum thickness of 50mm. This blinding layer must be above ground water level.

Installation

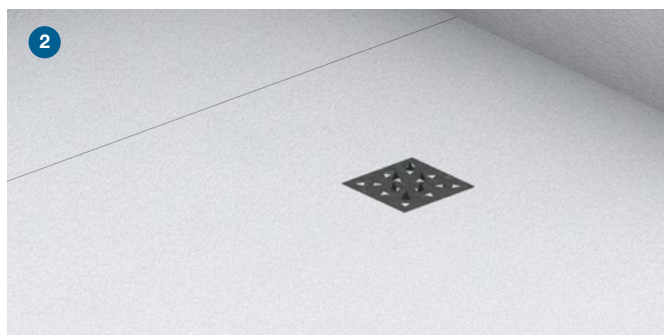
Step 1 - Place EPS Geofill blocks tightly together on the prepared sand levelling course as required by the engineer and as shown on the project drawings. If multiple layers are required, blocks should be offset, staggered and break-bonded at joints.

Step 2 - To prevent horizontal slippage during the backfill stage or in adverse weather conditions such as rain and freezing conditions use Stylite Gripper Plates between layers of blocks. Typical requirements are two gripper plates per standard size block.

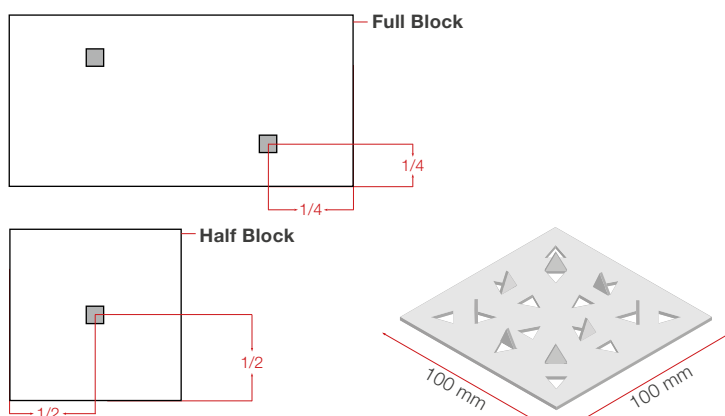
Step 3 - If required place a geomembrane over the EPS Geofill blocks. To complete the installation backfill or cover with the permanent overlying materials as quickly as practical.

Caution - In high winds use temporary ballast to prevent blocks displacing.

Note - This basic installation guide is not intended to cover every potential application of EPS Geofill. It is the responsibility of the engineer to specify the correct grade of material and for the contractor to install the system in accordance with the bespoke project drawings.



Stylite Gripper Plate :



Technical Specification

Features	EPS 70	EPS 100	EPS 150	EPS 200	EPS 250	EPS 300	Harmonised Standard
Compressive Strength @ 10 % (kPa)	70	100	150	200	250	300	BS EN 13163
Compressive Strength @ 1 % (kPa)	21	30	45	60	75	90	BS EN 13163
Nominal Density (kg/m ³)	15	20	25	30	35	40	BS EN 1602
Bending Strength (kPa)	115	150	200	250	350	450	BS EN 14933 : 2007
Shear Strength (kPa)	55	75	100	125	170	225	BS EN 14933 : 2007
Water Vapour Permeability (mg/(Pa.h.m))	0.015-0.030	0.009-0.020	0.009-0.020	0.006-0.015	0.006-0.015	0.006-0.015	BS EN 13163
Thermal Conductivity (W/mK)	0.038	0.036	0.034	0.034	0.034	0.034	BS EN 13163
Reaction to Fire Standard EPS	F	F	F	F	F	F	BS EN 13501-1
Reaction to Fire Fire Rated EPS	E	E	E	E	E	E	BS EN 13501-1
Dimensional Stability	DS (N) 5	DS (N) 5	DS (N) 5	DS (N) 5	DS (N) 5	DS (N) 5	BS EN 1603

Dimensions	Length mm	Width mm	Thickness mm
Stylite Geofill Standard Blocks	2400	1200	600
Bespoke Sizes Available Upon request	Bespoke sizes available - contact for details		

EN 13163 : 2015 | BS EN 14933 : 2007 | BS EN 1602 : 2013 | BS EN 12089 : 2013

Classification code : Pr_15_93_30_28

Recycling

Styrene Packaging & Insulation Ltd provide a waste EPS collection service to help recycle as much polystyrene as possible. Please download a copy of our recycling policy to find out how our recycling service can benefit you and the environment.

Certification

We have real pride in the products we supply that is why we go above and beyond to ensure that we surpass all current regulations and offer all the relevant certifications to stand by our expanded polystyrene products. For full details of our certifications please visit our website at www.styrene.biz

