



# Enhance the resistance of EPS Geo-foam with GP® TITANFLEX®

**A critical aspect of consideration when utilising EPS Geo-foam systems, is protecting them from degradation from in ground contaminants.**

**The TITANTECH® product portfolio has been proven to successfully enhance the resistance of the lightweight fill structure to contaminated ground, in particular GP® TITANFLEX®, when combined with EPS Geo-foam, provides a cost effective, sustainable and durable solution.**

## **What is EPS (Geo-foam)?**

Expanded polystyrene (EPS) Geo-foam has been used as a geotechnical material since the 1960s. EPS Geo-foam is approximately 1% the weight of soil and less than 10% the weight of other lightweight fill alternatives. As a lightweight fill, EPS Geo-foam reduces the loads imposed on adjacent and underlying soils and structures. EPS Geo-foam is not a general soil fill replacement material but is intended to solve engineering challenges.

## **How is EPS (Geo-foam) used?**

The use of EPS typically translates into benefits to construction schedules and lowers the overall cost of construction because it is easy to handle during construction, often without the need for special equipment, and is unaffected by occurring weather conditions. In addition, EPS Geo-foam can be easily cut and shaped on a project site, which further reduces jobsite challenges.



## INFO SHEET

### PROTECTION FROM GROUND CONTAMINANTS

## Example Applications

- Road widening
- Bridge abutment
- Bridge underfill
- Culverts, pipelines & buried structures
- Compensating foundation
- Rail embankment
- Landscaping & vegetative green roofs
- Retaining and buried wall backfill
- Slope stabilization

EPS Geo-foam can be reground, recycled and reused in many composite applications such as lightweight concrete, plastic lumber, weather resistant outdoor decks, fencing, drain field aggregate, etc. Compared with traditional fill materials, fewer trucks with lighter loads are required to deliver EPS Geo-foam to a project site. This in turn reduces pollution from fuel emissions and less wear and tear on the nation's roadways and infrastructure.

### Chemical Exposure

EPS Geo-foam can be damaged when exposed to certain hydrocarbon chemicals and it requires protection by incorporating a suitably resistant barrier membrane which can protect the EPS for the intended design service life (not just for the interim), which can be in excess of 100 years.

Designers should ensure that the geomembranes used are compatible with EPS, and designed to perform the barrier function for the intended design service life, such that durability is provided in the built environment. If using EPS Geo-foam in a location with contaminated soils then laboratory testing should be performed to determine the nature of the contaminants and their possible effects.

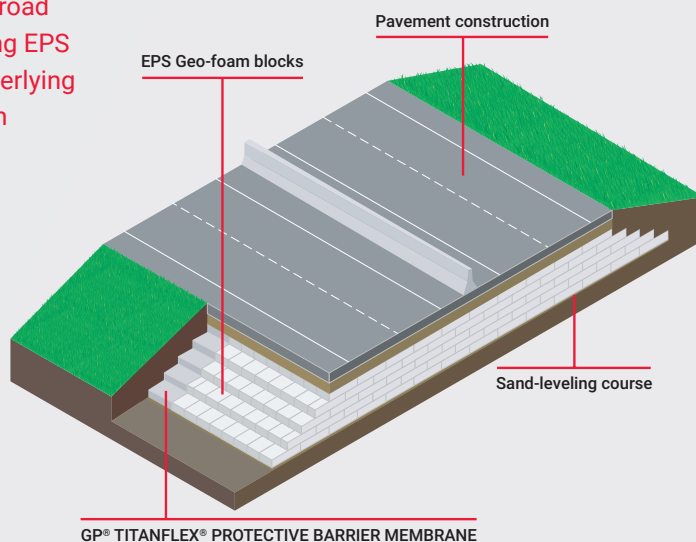
EPS can be damaged by and should not come in contact with the materials below. Protect EPS Geo-foam from contact with these materials both during construction and after project completion, you can do this by using an appropriate hydrocarbon-resistant geomembrane or other physical barrier:

- Hydrocarbons
- Chlorinated hydrocarbons
- Organic solvents
- Ketones
- Ethers
- Esters
- Diesel and gasoline
- Concentrated acids
- Vegetable oils
- Animal fats and oils
- Paraffin

If using EPS Geo-foam in a location of contaminated soils, laboratory testing should be performed to determine the nature of the contaminants, e.g. methane, and their possible impact on the EPS Geo-foam.

## Typical Application Detail

Cross section of road construction using EPS Geo-foam and overlying pavement system



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### PROTECTION FROM GROUND CONTAMINANTS

#### Example Applications

- Stadium & theatre seating
- Levees
- Airport runway/taxiway
- Foundations for lightweight structures
- Noise and vibration damping
- Compressible application
- Seismic application
- Permafrost embankments
- Rockfall/impact protection

#### GP® TITANFLEX®

Is a unique construction membrane proven to protect against moisture, and the widest range of in-ground environmental hazards. GP®

TITANFLEX® has set new standards following its certification by the British Board of Agreement (BBA).

The membranes are the first products of their kind that combine water resistance with protection against hazardous gases, VOC vapors, hydrocarbons and other chemicals that may be present in contaminated land. GP® TITANFLEX® provides an innovative and durable solution to problems faced with many development sites across the globe.

JUTA UK has invested significantly in the testing of the system, providing a substantial amount of product and test data, to enable the end users,

specifiers and clients to take comfort that the products are suitable, fit for purpose and designed to last for the lifetime of the structure.

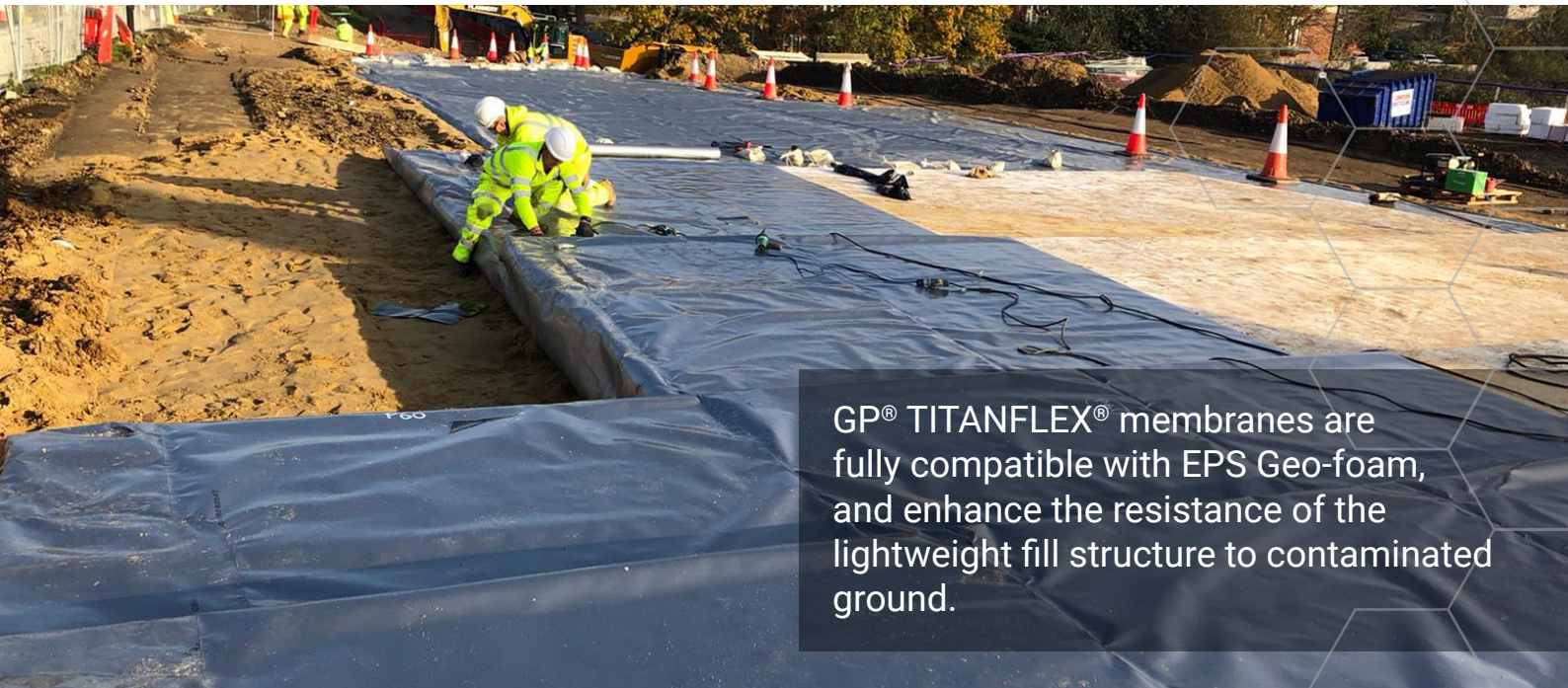
GP® TITANFLEX® membranes are BBA Certified for use in a range of situations and provide protection against hydrocarbon and VOC vapors, as well as common ground gases such as carbon dioxide, methane and radon. The membranes offer exceptional robustness and long-term durability and are already proving their efficacy on challenging projects, including one of the most contaminated residential development sites in the UK.

We have the widest range of test data for barrier membranes globally, and durability testing for extremely aggressive ground conditions, which enables us to provide enhanced

material warranties of more than 120 years, for even the more challenging sites.

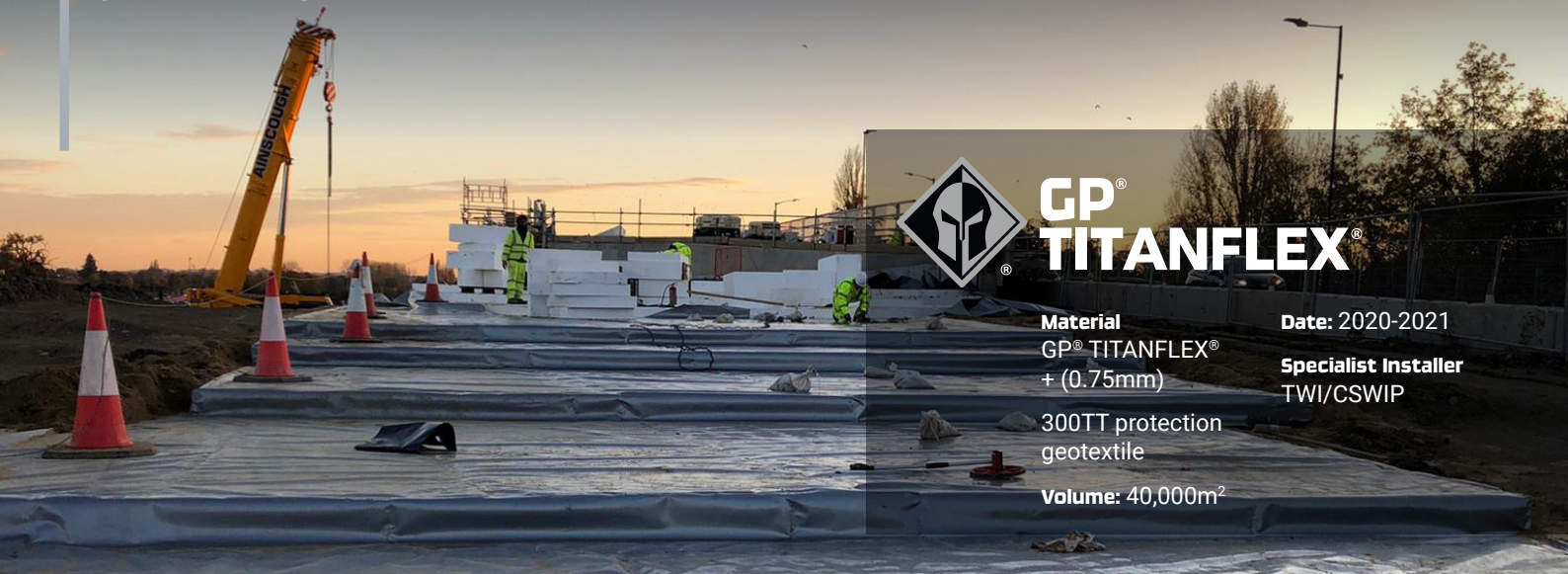
Although many membranes which JUTA UK manufacture and supply are chemically resistant to hydrocarbons (HDPE and LLDPE) their ability to resist permeation of challenging chemicals long term is not optimal for sensitive applications, which often means we are unable to guarantee the performance (durability) over time.

GP® TITANFLEX® membranes are fully compatible with EPS Geo-foam, and enhance the resistance of the lightweight fill structure to contaminated ground – which also enables a less stringent screening profile for earthworks fill placed on top of the lightweight fill, providing both a cost effective, sustainable and durable solution.



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**INFO SHEET**  
PROTECTION FROM GROUND  
CONTAMINANTS



**GP<sup>®</sup>**  
**TITANFLEX<sup>®</sup>**

**Material**

GP<sup>®</sup> TITANFLEX<sup>®</sup>  
+ (0.75mm)

300TT protection  
geotextile

**Volume:** 40,000m<sup>2</sup>

**Date:** 2020-2021

**Specialist Installer**  
TWI/CSWIP

**M4 Case Study**

Over 40,000m<sup>2</sup> of GP<sup>®</sup> TITANFLEX<sup>®</sup> + (0.75mm) and 300TT protection geotextile was specified and utilised for a lightweight fill EPS embankment protection on the M4 motorway expansion works.

The GP<sup>®</sup> TITANFLEX<sup>®</sup> + membranes were selected due to their extremely low permeability to challenge chemicals identified on site in the contaminated ground, and re-fill earthworks. Choosing to utilise the GP<sup>®</sup> TITANFLEX<sup>®</sup> + membranes over traditional barrier membranes (such as our HDPE) enabled the lightweight fill application, this provided a significant carbon saving on the overall project through minimised transport and earthworks activity.

As JUTA UK were able to demonstrate, and justify chemical resistance of the GP<sup>®</sup> TITANFLEX<sup>®</sup> + membrane for the site setting through specific test data, to warrant protection of the EPS Geo-foam. This was opposed to generic statements of durability, specification criteria for durability in excess of 120 years was achievable for a Category 5 structure.

The materials were installed by a specialist installer with TWI/CSWIP plastic welding accreditation, and approved by JUTA UK for use of the membranes, allowing a fully welded install. The use of tapes is prohibited in protective barrier installations, as the tapes joints are a weak point in any system, and long term durability requirements could not be achieved if utilising tapes.

JUTA UK commented:

**“The GP<sup>®</sup> TITANFLEX<sup>®</sup> + membranes were selected due to their extremely low permeability to challenge chemicals identified on site in the contaminated ground, and re-fill earthworks.”**