Position statement:

Design Guidance for Geocellular Systems

This position statement has been issued by the BPF Pipes Group (November 2025) on behalf of its members

https://www.bpfpipesgroup.com/members/member-listings/

Modular plastic geocellular units are commonly used as a cost-effective method of providing stormwater infiltration (soakaways) and attenuation tanks for new developments. They were first used in the mid-1980s in Europe below pavements to store stormwater. Their use soon spread to on-site stormwater management for residential, commercial and industrial developments and rainwater harvesting. Since the early 1990s, they have been used to construct stormwater attenuation tanks and soakaways worldwide successfully.

In 2009, CIRIA published design guidance in report C680 *"Structural design of modular geocellular drainage tanks"*, which provided designers with a methodology to determine the structural integrity of tanks. In the view of the BPF Pipes Group this method continues to provide an effective and conservative approach to designing and installing plastic modular geocellular drainage systems.

2016 saw the publication of CIRIA C737 (with the same title), which was intended to supersede C680.

BPF Pipes Group members feel that C737 does not adequately carry over the philosophy of thermoplastic behaviour to the structural design, instead treating geocellular structures in the same way as rigid structures such as concrete. Failure models based on rigid structures lead to overdesign, inconsistent with industry experience of plastic behaviour.

As a result, we published Technical Guidance *"Guide to Designing Geocellular Drainage Systems to CIRIA Report C737"*[1] which contained suggestions on the appropriate factors to use in geotechnical assessment. If a designer still wishes to design to C737, the BPF Technical Guidance is still valid.

[1] https://www.bpfpipesgroup.com/media/78061/Guide-to-designing-geocellular-drainage-systems-to-CIRIA-Report-C737-Sept-2018-Issue-2.pdf

Our industry recognised that the C737 approach is 'out of step' with geotechnical design for these structures in mainland Europe and has fully participated in the development of European standards and technical specifications to foster a Europe wide approach.

In 2019 the first European standards (ENs) for product testing of exclusively thermoplastic systems were published.

CEN TS 17152-4 has been developed as a European Technical Specification and was published in the UK in 2025[2] . This Guidance brings together the experience from across Europe and is consistent with Eurocodes but adapted for thermoplastic behaviour and the resultant soil interaction.

The new guidance integrates with the suite of standards that have been developed to characterise the behaviour and long-term performance of geocellular systems:

- EN 17150:2019 *Test method for determination of short-term compression strength of boxes*
- EN 17151:2019 *Test method for determination of long-term compression strength of boxes*
- EN 17151-2 *Test method for determination of creep behaviour of boxes (in development)*
- EN 17152-1:2019 *Specifications for storm water boxes made of PP and PVC-U*
- CEN/TS 17152-3:2022 *Assessment of conformity*
- CEN/TS 17152-4:2025 *Guidance for structural design of modular systems*

Taken together, this suite of standards specifies the required performance data to be supplied by the manufacturer, ensures it is consistent across products wherever manufactured, and how the data is used in designing systems for long-term installation.

Additional information

Guidance on installation can be found in CEN/TR 17179:2018 *Rainwater infiltration and storage attenuation systems - Practices for underground installation*.

Advice on *Maximising the lifespan of plastic geocellular drainage systems* can be downloaded from the BPF website[3].

[2] Published in the UK as PD CEN/TS 17152-4:2025 *Plastics piping systems for non-pressure underground conveyance and storage of potable water — Boxes used for infiltration attenuation and storage systems. Part 4: Guidance for structural design of modular systems*

[3] https://www.bpfpipesgroup.com/media/66588/Maximising-the-lifespan-of-plastic-geocellular-drainage-systems.pdf