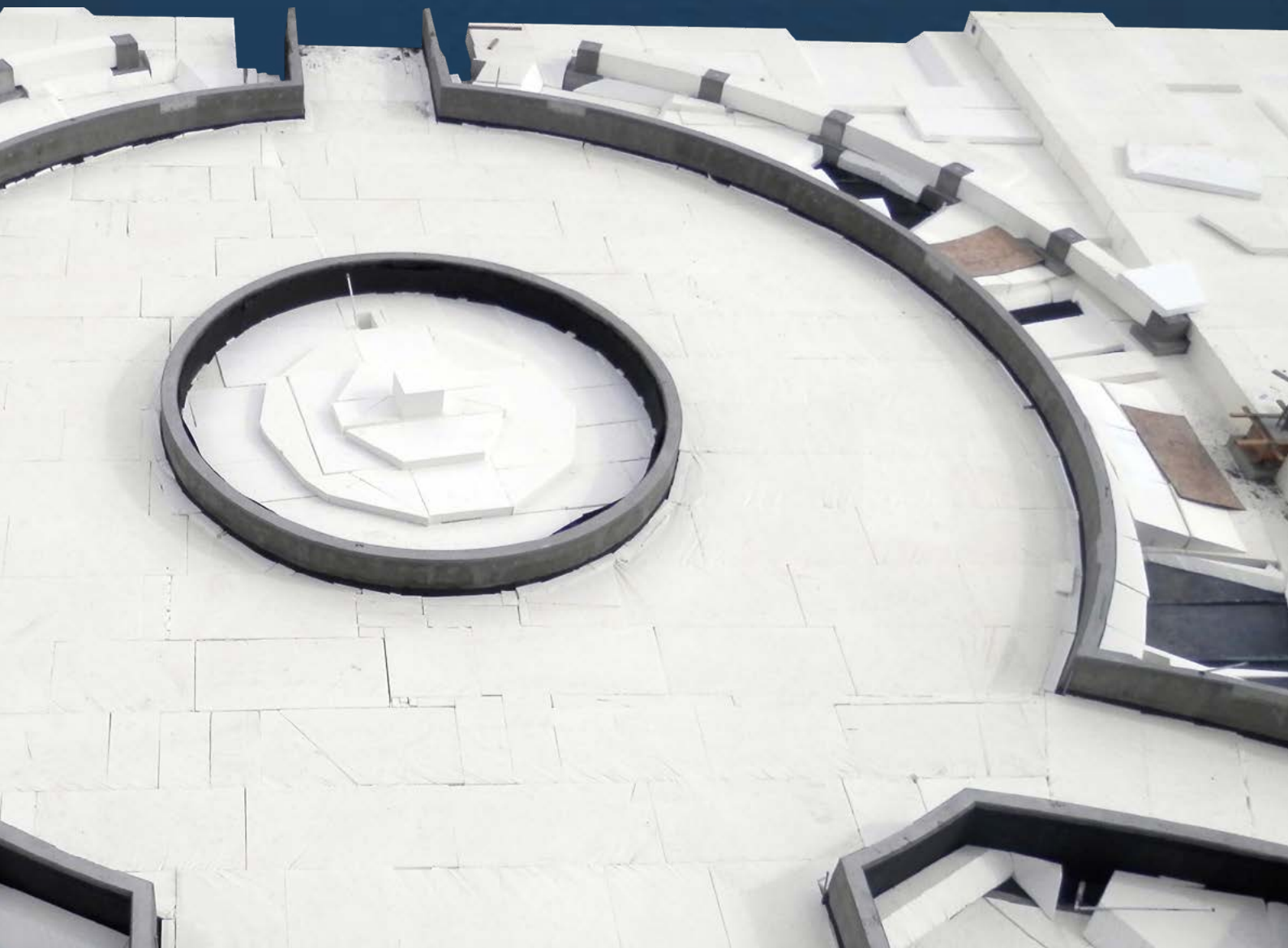


Unibloc®

Compressible Inclusion by Unipod®

Technical Product Brochure



In order to meet the ever-changing needs of its valued customers and the market, Unipod® continually tests, validates and improves its Unibloc Geofoam® Compressible Inclusion product range. As a function of this, the information contained in the Unibloc Geofoam® Compressible Inclusion technical product brochure is regularly updated and may have changed. To ensure review of the most up to date version of the brochure, please visit the Unipod® website at www.unipod.com.au to download the latest version of the Unipod® Unibloc Geofoam® Compressible Inclusion technical brochure.

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GeoFoam Introduction

Unibloc Geofoam® Compressible Inclusion by Unipod®, is a lightweight high-performance Expanded Polystyrene (EPS) fill material that exhibits exceptional load absorption and dissipation characteristics, specifically designed for application in technical civil engineering applications. By way of definition, a Compressible Inclusion is classified as a material that is significantly more compressible, at least in one direction, than other materials that it is in direct contact with.

The Unibloc Geofoam® Compressible Inclusion products exemplary strength to weight ratio makes it the ideal choice for absorbing and dissipating heavy structural and mechanical loads, making it an ideal material for the protection of sensitive buried civil infrastructure such as concrete piping. For the same occupied volume, Unibloc Geofoam's® EPS Compressible Inclusion block typically weighs approximately 1-2% of the weight of most soil and rock types that are typically used as fill materials and approximately 10% of the weight of some other light weight fill materials.





Unibloc GeoFoam® Compressible Inclusions are manufactured from thousands of individual EPS beads that have been expanded and fused together under the controlled influence of heat and pressure to form solid rectangular blocks. This precise manufacturing process results in the creation of a durable, chemically inert, high performance, civil construction material that is completely safe to handle and exhibits a unique set of structural properties such as, exceptional strength to weight ratio, high resistance to water absorption and resistance to bacterial and fungal attack.

The unique, highly stable, cellular structure of the Unibloc GeoFoam® Compressible Inclusion, results in the superior absorption and dissipation of high compressive or crush loads, as the physical properties and performance of the material are isotropic, meaning that the physical properties are the same in all directions.

These are just some of the superior characteristics of the Unibloc GeoFoam® Compressible Inclusion that ensure the durability and long-term continuous performance of the product when installed as a Compressible Inclusion in various complex civil construction applications that demand long operational life spans.

The Unibloc GeoFoams® Compressible Inclusion products unique properties have seen its popularity grow, as the ever-increasing numbers of civil engineers and construction specifiers recognise its enhanced performance and significant cost saving benefits when compared to the use of other Compressible Inclusion materials. Simply put, Unibloc GeoFoam® is your complete, high performance Compressible Inclusion solution.

Is EPS a proven Material?

For nearly 50 years, Expanded Polystyrene (EPS) has proven itself to be a widely used, reliable and dependable material that has been extensively used in civil, as well as many other applications all over the world. The specific use of Geofoam in civil engineering applications commenced in Scandinavia back in 1971. Since that time, Geofoam has been used in geotechnical applications throughout the world.

The Unipod® GeoFoam® Compressible Inclusion (EPS moulded) blocks are manufactured at Unipods® state of the art manufacturing plant in Truganina, Victoria, using the latest EPS manufacturing equipment and technology, resulting in a versatile product that offers a unique set of characteristics and physical performance properties that the Australian Civil infrastructure industry demands.



Unibloc GeoFoam® Compressible Inclusions can be supplied in a range of standard block dimensions

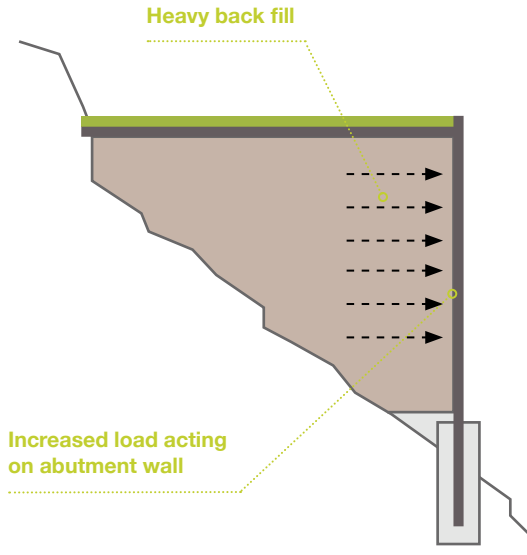
- 1.2m width.
- 2.5m, 3.0m, 5.0m, or 6.0m lengths.
- 75mm up to 1.20m thickness.
- Where unique project requirements exist, Unibloc GeoFoam® EPS Compressible Inclusion blocks can be supplied in specific custom lengths, widths and thicknesses to suit.

As part of Unipods® ongoing commitment to quality, innovative product development and superior customer service, Unipod® have achieved and are fully ISO 9001 Certified. Together with our industry first, complete product traceability system and our customer portal- Foamhub, Unipod® continues to lead the Australian EPS industry in providing innovation, quality, consistency, visibility and continuous improvement in all EPS products that we manufacture, including the Unibloc GeoFoam® EPS Compressible Inclusion product.

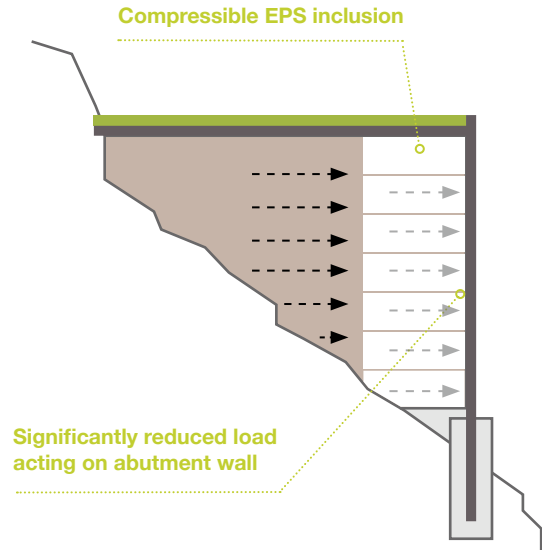
With unique compressibility and flexibility characteristics, the use of Unibloc GeoFoam® EPS as a Compressible Inclusion can provide innovative solutions to a range of common civil engineering challenges that structural engineers and designers commonly face every day, including but not limited to high load bearing dissipation requirements, protection from earthquake shock and noise and vibration dampening.



Without Compressible Inclusion



With Compressible Inclusion



The Compressible Inclusion function of Unibloc GeoFoam® EPS

The use of Expanded Polystyrene (EPS) block in the form of a Compressible Inclusion, can be applied both in the rehabilitation or upgrading of existing structures and also in new constructions. Uniblocs GeoFoam® Compressible Inclusions can also be used to accommodate ground or structure movement. Its use can result in significant reduction in earth pressures under static and dynamic loading being applied, helping to protect sensitive buried infrastructure such as concrete pipes and telecommunication cables etc.

There are various geotechnical applications in which the Unibloc GeoFoam® Compressible Inclusion product can be applied, such as behind earth retaining structures and above tunnels, around foundation elements, pipes and culverts. As the Unibloc GeoFoam® EPS

block inclusion is the most compressible component of the structure-inclusion-ground system, the Unibloc GeoFoam® Compressible Inclusion will take up applied loads and deform more readily than the other system components undergoing the same applied stress or displacement.

This selective compression or crush behaviour of the Unibloc GeoFoam® Compressible Inclusion can result in a variety of benefits. In most cases, this results in significantly reduced loads being imparted on a buried structure that would not be possible if the Compressible Inclusion was not present. In many cases, the use of a Compressible Inclusion is a more cost-effective alternative than having to design the structure to withstand greater loads and stresses.

Selection of Unibloc GeoFoam® as a Compressible Inclusion material

Unibloc GeoFoam® EPS block is an excellent material for selection as a Compressible Inclusion, because it exhibits predictable and controllable stress strain behaviour and maintains this predictable behaviour even when wet. Importantly it does not decompose or change structure when wet.

For Compressible Inclusion applications, stiffness of the Unibloc GeoFoam® EPS block in the primary displacement direction is the most relevant property.

Unibloc GeoFoam® Compressible Inclusion applications

For Unibloc GeoFoam® Compressible Inclusion applications, low density Geofoam, nominally 13 kg/m³, is generally the most desirable grade selection, as both the Initial Young's Modulus and Compressive Strength (typically defined as compressive stress at 10% strain) decreases with decreasing density. Experience indicates that the minimum EPS density that strikes a good balance between stiffness and durability is approximately 13 kg/m³.



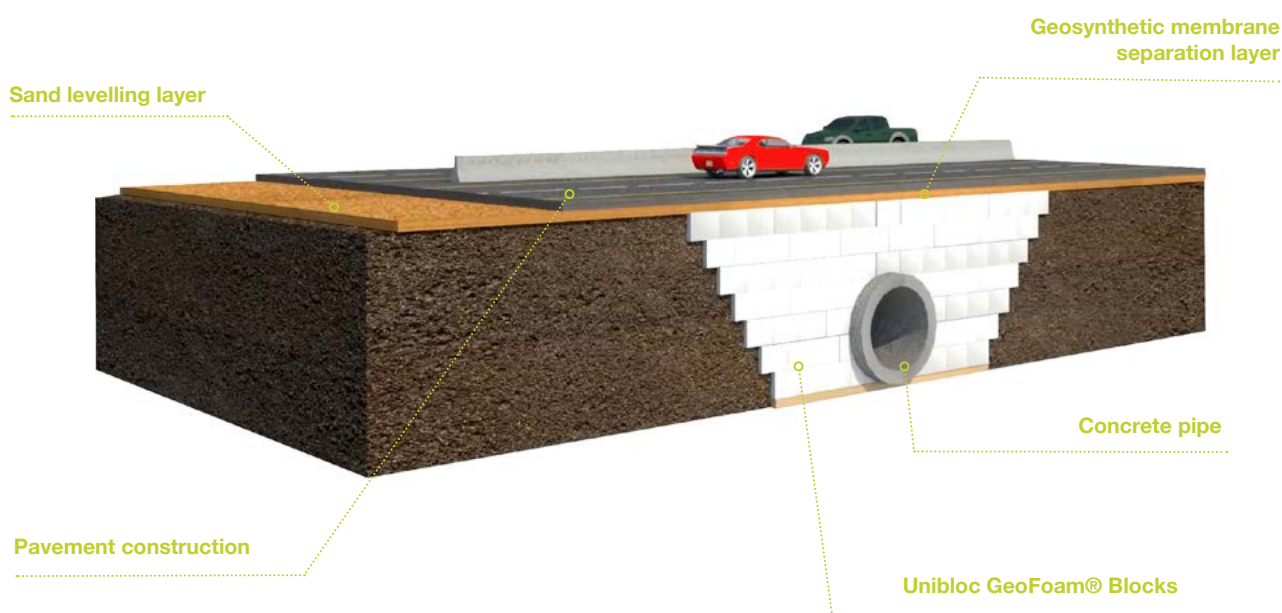
Examples of the use of Compressible Inclusions

1. Volume change of earth materials

There are several situations where volume changes of soil and rock are caused by physical changes within these naturally occurring material. Examples include: The freezing of soils and / or rocks that can cause swelling and changes in material volume and shape due to sustained water absorption over time as well as mineral changes, or the potential for release of tectonic stresses. When such materials are adjacent to manmade earth retaining structures, especially rigid, non-yielding ones, the lateral pressure generated by the expanding soil or rocks can be significant, potentially damaging or completely destroying the structures.

The use of the Unibloc GeoFoam® Compressible Inclusion between the man made structure and the naturally occurring ground cover, can allow the expanding soil or rock to deform laterally, whilst transmitting only a fraction of the overall imparted stress to the structure itself, as the loads and stresses are safely absorbed and distributed / dissipated by the Unibloc GeoFoam® Compressible Inclusion. The use of the Unibloc GeoFoam® Compressible Inclusion to reduce lateral pressures due to the swelling of soils or rocks, is particularly attractive given the extensive occurrence of such highly reactive soil and rock types being prevalent all over the world.

Schematic drawing of a Unibloc GeoFoam® Compressible Inclusion application in a culvert providing protection for the existing concrete pipe from significant design loads.



2. Accommodating Structure Movement

There are situations where lateral displacement of an earth retaining structure is caused by external factors other than naturally occurring lateral earth pressures. This can potentially occur primarily in rigid, indeterminate structures that are subjected to temperature-induced strain. Typical examples include bridges, especially those with internal abutments.

In some cases, this movement can result in the resulting lateral earth pressures acting on the retaining structure in excess of what would be experienced at rest and approaching the passive state. In this scenario, the traditional approach is to

design the structure to be able to withstand these elevated potential earth pressures. In some cases however, it may be necessary to repair or even replace structures that are distressed because of inadequate design.

A more cost-effective alternative for both new and remedial construction, may be to use the Unibloc GeoFoam® Compressible Inclusion to allow the structure to be able to move or be displaced, whilst transmitting a reduced magnitude of displacement to the retained soil.

Photo of an example of where EPS Block Geofoam has been used as a Compressible Inclusion around a reinforced concrete beam in expansive soil in the UK.



Lightweight characteristics of GeoFoam® Compressible Inclusions

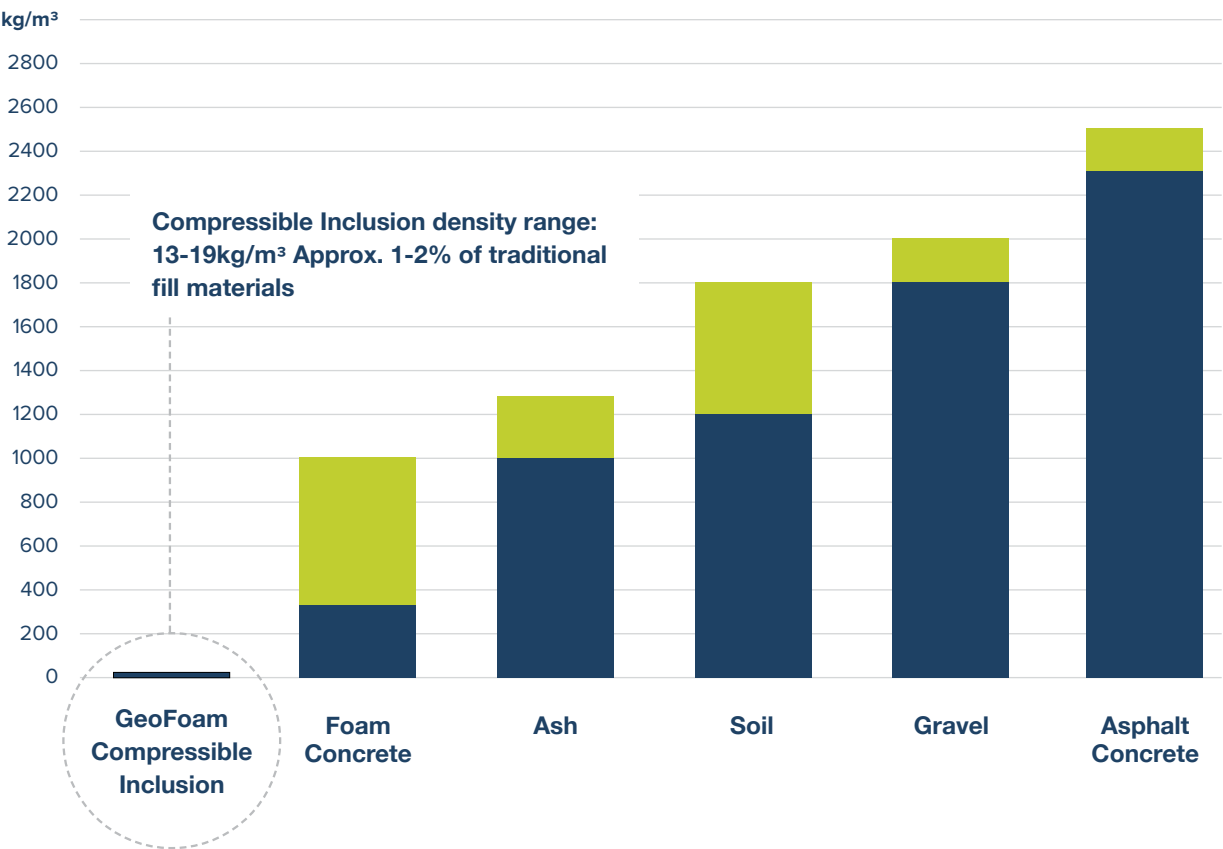
The Unibloc GeoFoam® Compressible Inclusions are able to be manufactured in low densities of 13g/l resulting in weights of just 13kg/m³. As a result of this very light weight per unit area characteristic, the Unibloc GeoFoam® Compressible Inclusions end up imparting negligible dead loads or stresses directly to the underlying soils, structures and utilities.

This is highly advantageous where the existing soils or fill materials may be poorly suited to support additional loading requirements (e.g., compressible clay, peats, etc.) Existing loads can be significantly reduced by excavating and replacing the existing native soils which

commonly weigh upwards of 1.5 tonnes per cubic metre, with the Unibloc GeoFoam® Compressible Inclusions which weigh a minute fraction of this.

Furthermore, the replacement of heavy density soils with the Unibloc® GeoFoam® Compressible Inclusions assists in eliminating the need for specialised foundations or site preloading to be installed to reduce settlement and improve bearing capacity. Additionally, the use of the Unibloc GeoFoam® Compressible Inclusions over existing utilities can eliminate the need for utility removal, relocation or redesign.

Density comparison between GeoFoam Compressible Inclusion & other civil construction material



Unibloc GeoFoam® Compressible Inclusion Physical Properties

Unibloc GeoFoam® meets or exceeds the requirements of Australian Standard AS 1366.3 and American Standard Test Method ASTM D6817” Standard Specification for Rigid, Cellular Expanded Polystyrene (EPS) Geofoam”. Unipod conducts routine, rigorous testing of Unibloc GeoFoam® to ensure quality is maintained to these standards.

Physical Properties of GeoFoam

As per Australian Standard AS 1366.3, 1992

Physical Property	Unit of measure	Class of EPS			Test Method
Unibloc GeoFoam® Grade		SL	S	M	
Nominal density	Kg/m ³	13.5	16	19	ISO 845
Compressive Stress at 1% deformation (min.)	kPa	23	30	35	AS 2498.3
Cross-break Strength (min.)	kPa	135	165	200	AS 2498.4
Rate of water vapour transmission (max.) parallel to rise at 23°C	µg/m ² s	630	580	520	AS2498.5
Dimensional stability of length, width, thickness (max.) at 70°C, dry condition seven days	Percent	1	1	1	AS 2498.6
(R-value) Thermal resistance (50 mm sample) at a mean temperature of 23°C	m ² K/W	1.23	1.27	1.32	AS 2464.6
Thermal conductivity (k) measured at 23°C	W/mK	0.0407	0.0394	0.038	AS 2464.5
Flame propagation characteristics:					AS 2122.1
– Median flame duration (max.)	Seconds	2	2	2	
– Eight value (max.)	Seconds	3	3	3	
– Median volume retained (min.)	Percent	18	22	30	
– Eight value (min.)	Percent	15	19	27	
Buoyancy Force	Kg/m ³	986	984	981	

As per the American Standard Test Method ASTM D6817

Physical Property	Unit of measure	Class of EPS			Test Method
Unibloc GeoFoam® Grade		SL	S	M	
Compressive Stress at 1% deformation (min.)	kPa	22	31	42	ASTM D6817
Elastic Modulus (min.)	kPa	2200	3150	4200	ASTM D6817

Chemical exposure

There may be instances in certain civil infrastructure construction applications where the Unibloc GeoFoam® Compressible Inclusions may be potentially subjected to chemical exposure. This can be either by direct exposure /contact with the chemicals themselves, or through exposure / contact to the vapours or volatile organic compounds (VOC's) that the chemicals may give off.

The potential for exposure to chemicals will most commonly occur during installation of the Unibloc GeoFoam® Compressible Inclusions on site or as a result of contaminated site conditions that may occur after the Unibloc GeoFoam® Compressible Inclusions have already been installed.

The table to the right provides general guidance for the resistance of the Unibloc GeoFoam® Compressible Inclusions to a large number of industrial chemicals. The table is intended to provide a preliminary guide only. It does not guarantee long term performance of the Unibloc GeoFoam® Compressible Inclusions when in contact with the listed or any other chemicals.

The information contained therein does not guarantee the long term performance of Unibloc GeoFoam® when in contact with the listed or any other chemicals. It is recommended that laboratory tests modelled to represent chemical exposure in end use conditions, be conducted to assure efficacy of the Unibloc GeoFoam® in the chosen application.

Chemical	Rating
Acetic acid (5%)	C
Acetic acid (10%)	I
Acetone	I
Alkalies	C
Ammonia	I
Animal Fats and Oils	I
Benzene	I
Butyl alcohol	C
Chlorinated Hydrocarbons	I
Citric Acid (10%)	C
Citric Acid (20%)	I
Detergents	I
Diesel Fuel	I
Dilute Inorganic Acids	C
Ethers	I
Ethyl Acetate (98%)	I
Ethyl Alcohol (95%)	I
Ethylene Glycol	I
Gypsum Plaster	C
Hexane	I
Hydrocarbons	I
Hydrochloric Acid (10%)	C
Hydrochloric Acid (38%)	I
Hydrochloric Acid (100%)	I
Hydrogen Peroxide (30%)	C
Isopropyl Alcohol	I

C = Compatible with Unibloc GeoFoam®

I = Incompatible with Unibloc GeoFoam®

Chemical	Rating
Ketones	I
Methyl Alcohol	I
Methyl Ethyl Ketone	I
Mineral Oil	C
Motor Oil	I
Nitric Acid (20%)	I
Organic Solvents	I
Paint Thinner	I
Paraffin	I
Petrol (Gasoline)	I
Petroleum Jelly	C
Potassium Hydroxide (30%)	C
Portland Cement	C
Propyl Alcohol	I
Propylene Glycol	C
Silicone Oil	C
Sodium Chloride (saturated)	I
Sodium Hypochlorite (15%)	C
Sodium Hydroxide (40%)	C
Solvent Free Bitumen	C
Sulphuric Acid (50%)	I
Sulphuric Acid (96%)	I
Toluene	I
Turpentine	I
Vegetable Oils	I
Salt Water (Brine or Sea Water)	C
Xylene	I

C = Compatible with Unibloc GeoFoam®

I = Incompatible with Unibloc GeoFoam®

If the exposure of the Unibloc GeoFoam® Compressible Inclusions to any harmful chemicals is a possibility or in doubt, the Unibloc GeoFoam® Compressible Inclusions should always be protected by means of an appropriate barrier material being applied. An example of where this would be applicable, is in the case of a road construction where Unibloc GeoFoam® blocks have been used as the Compressible Inclusion to protect the buried infrastructure that the road passes over. If there was to be a vehicular accident which could cause petrol (benzene), motor oil, brake fluid, (glycol ether) radiator coolant (glycol) or other chemicals to potentially be released, these chemicals could seep through the various ground layers and eventually come into contact with the Unibloc GeoFoam® Compressible Inclusions sub structure.

The Unibloc GeoFoam® Compressible Inclusions must be protected by an appropriate geo-synthetic textile membrane barrier material, if there is any potential for exposure to these chemicals either during installation or during the material's serviceable life. In selecting a suitable geotextile membrane barrier, its compatibility with the Unibloc GeoFoam® Compressible Inclusions must be confirmed prior to application. There are a number of compatible hydrocarbon resistant geotextile membranes that could be used to protect the Unibloc GeoFoam® Compressible Inclusions such as Polypropylene (PP), polyethylene (PE), Chlorosulphonated Polyethylene (CSPE) and Ethylene Interpolymer Alloys (EIAs).

The above information should be used as a guide only. Consultation with a qualified geotechnical engineer or specialist geotextile membrane supplier should always be undertaken, as to the selection of the most suitable membrane for a given application which ensures compatibility with the Unibloc GeoFoam® Compressible Inclusion product.

Lateral resistance (Coefficient of Friction)

The lateral resistance of the Unibloc GeoFoam® Compressible Inclusions is based on the inherent friction that naturally exists between layers of Unibloc GeoFoam® Compressible Inclusion EPS blocks that are in direct contact with one another, unless some special design (such as adhesives or shear keys) are used to join the blocks.

The coefficient of friction, μ , between Unibloc GeoFoam® Compressible Inclusion blocks along moulded faces is 0.5. The coefficient of friction is higher along cut faces of the blocks where there is increased surface roughness. The coefficient of friction for a wire cut face of a block can be assumed to be the same as a moulded face of a block (i.e. 0.5)

Load distribution: (Poisson's Ratio):

The Poisson's ratio for Unibloc GeoFoam® is approximately 0.12 within the elastic range.

Product stability

The Unibloc GeoFoam® Compressible Inclusion being made from expanded polystyrene is an inert, inorganic material that will not rot and is resistant to mould, mildew and fungi. Unibloc GeoFoam® Compressible Inclusions are non-toxic, odourless and non-irritating to the skin or eyes. They contain no HCFCs and are safe for the environment. Furthermore, Unibloc GeoFoam® Compressible Inclusions offer no nutritional value to most insects and do not attract ants, termites or rodents. They are unaffected by the normal range of climatic conditions and temperatures and when specified and installed correctly, they can be considered as a permanent long-life solution.

The Unibloc GeoFoam® Compressible Inclusions exhibit a long service life and are able to withstand the effects of long-term temperature cycling and will retain their physical properties under engineered conditions of use. There are civil road projects constructed in the 1970's in Europe that used EPS Geofoam that are still in full service today. Geofoam has also been in use in similar applications in Australia since its introduction in the early 1990's.

For applications in areas where termites are known to persist, Unibloc GeoFoam® Compressible Inclusions can also be manufactured with a termite repellent additive.



The insulation characteristics of Unibloc GeoFoam® Compressible Inclusion

As the Unibloc GeoFoam® Compressible Inclusion EPS block is 96-98% air by volume, and air is the best insulating medium, EPS is considered to be one of the most efficient man made thermally insulating materials available. As a function of its superior insulating capacity compared with most other man made and naturally occurring materials, EPS insulation has been used in residential and commercial building construction in ceilings, walls and floor systems etc, for many years.

Unibloc GeoFoam® Compressible Inclusion protection from exposure to fire:

The Unibloc GeoFoam® Compressible Inclusions are manufactured with an environmentally approved non HBCD derived flame retardant additive (Poly FR). This flame retardant inhibits the early stages of fire development and propagation. Like many commonly available construction materials however, EPS is deemed combustible. Thus, where the Unibloc GeoFoam® Compressible Inclusions are intended to be used, appropriate precautions should be implemented on site.

The Unibloc GeoFoam® Compressible Inclusions should be suitably protected from exposure to open flame sources from processes such as welding or other hot work that may be undertaken on a given project site. Once installed however, the Unibloc GeoFoam® Compressible Inclusions will be fully protected from fire or open flame exposure by the overburden material covering them, be that soil, concrete or other forms of cover material.



Effects of UV light exposure on Unibloc GeoFoam® Compressible Inclusions:

EPS is susceptible to ultra-violet (UV) degradation if exposed to direct sunlight for long periods of time. Where UV degradation has occurred, this can be identified by the development of a pale yellow coloured friable layer which occurs directly on the surface of the Unibloc GeoFoam® Compressible Inclusions over time. This friable layer is normally only a few mm deep and can be safely and effectively removed by a scourer or the use of a high-pressure water cleaner.

The development of this friable layer will have a negligible detrimental effect on the overall physical properties of the Unibloc GeoFoam® Compressible Inclusions. It is recommended however, that in areas of high UV concentration, or where the Unibloc GeoFoam® Compressible Inclusions may be exposed to direct sunlight for extended periods of time (weeks or months), that where ever possible, the blocks be kept under shaded cover or physically covered using a hessian canvas or other UV resistant type material.

Under no circumstances however should a clear plastic cover be used to cover the Unibloc GeoFoam® Compressible Inclusions, if they are intended to be stored on site for prolonged periods of time prior to installation.

Effects of Wind Exposure on Unibloc GeoFoam® Compressible Inclusions:

Due to the lightweight nature of the Unibloc GeoFoam® Compressible Inclusions, exposure to high winds should be avoided where possible. Where applicable, wind speeds should be monitored on site, especially during project construction and installation of the Unibloc GeoFoam® Compressible Inclusions. Where possible, installation and/or movement of Unibloc GeoFoam® Compressible Inclusions on site, should be avoided on windy days.

Furthermore, where strong winds may prevail and are an ongoing concern on a given job site, overburden weight restraints such as sandbags should be placed on top of each of the Unibloc GeoFoam® Compressible Inclusions once the blocks have been installed in place (as per the photo shown below). All installed blocks should be tethered together by the use of Unipod® Unibloc GeoFoam® geo-grippers to prevent the potential for the individual blocks shifting under the influence of strong wind loads.



Unibloc GeoFoam® GeoGripper plate

The Unipod® Unibloc® GeoGripper Plate is a proprietary galvanized steel multi-barbed Unibloc GeoFoam® Compressible Inclusion block mechanical connector. Unipod® is the exclusive Australian distributor of the GeoGripper mechanical connector plate. It is used to restrain rigid foam from moving laterally when Unibloc GeoFoam® Compressible Inclusions are installed in “layer upon layer” applications.

Its unique single piece / two-sided barb design allows for excellent connection between the individual block layers in a one-step application. The use of the Unipod® Unibloc® GeoGripper mechanical connector plate keeps the Unibloc GeoFoam® Compressible Inclusion blocks from being displaced in windy conditions.



Buoyancy characteristics

As a function of the Unibloc® GeoFoams® Compressible Inclusions rigid closed-cell structure and light weight characteristics, it is very buoyant. Subsequently, care must be taken during civil project design, construction and post-construction, to ensure that any potential for exposure of the Unibloc GeoFoam® Compressible Inclusion blocks to hydrostatic uplift forces has been accounted for within the hydrological conditions of the project site in question.

Adequate surcharge, i.e., soil or pavement cover, or an alternate means of passive restraint (anchoring of the blocks) must be provided to guard against the potential for hydrostatic uplift of the blocks once installed. Alternately, the material can be installed above the water table or the water table can be lowered using suitable drainage techniques and / or other dewatering systems.

Drainage (generally a sand or gravel layer) can be provided between the Unibloc GeoFoam® Compressible Inclusions and the natural soils to reduce the potential for hydrostatic uplift occurring. Appropriate design consideration for adequate drainage of groundwater and / or surficial waters below the Unibloc GeoFoam® Compressible Inclusions will assist in preventing water from infiltrating upwards through to the Unibloc GeoFoam® Compressible Inclusions. This will assist in reducing the potential for the development of hydrostatic uplift forces, which could cause displacement of the Unibloc GeoFoam® Compressible Inclusion blocks in situ.

Product sustainability

Where Unibloc GeoFoam® Compressible Inclusion off cuts are generated on site, these can be reused in other areas of the site. Where the Unibloc GeoFoam® Compressible Inclusion off cuts are not able to be reused, Unipod® offers a clean GeoFoam recyclable waste pick up service. The recycled Unibloc GeoFoam® Compressible Inclusion off cuts can then be recycled into a variety of differing products and applications such as picture frames, and lightweight concrete.



EPS offcuts being recycled at Unipod®.

Water absorption characteristics

Unibloc GeoFoam® Compressible Inclusions are non-soluble materials that have a rigid, closed-cell structure that limits water absorption and inhibits the mass migration of liquids through their structure.

Even under prolonged saturation, the individual EPS bead cells of each Unibloc GeoFoam® Compressible Inclusion maintain their physical shape, size, cohesion, appearance and structural integrity.

When used in well-drained conditions, no change in Unibloc GeoFoam® Compressible Inclusion block weight is expected to occur as a function of intermittent exposure to water or moisture over time. A negligible increase of less than 5% in the overall weight of Unibloc GeoFoam® Compressible Inclusion blocks can be expected over time however, if the blocks are installed in a partially or completely submerged application.

Our Service Commitment

Sales & Service

You can have full confidence in the long-term sales and service of the Unibloc GeoFoam® Compressible Inclusions because they are proudly designed and manufactured right here in Australia by Unipod® – One of Australia's largest producers of Expanded Polystyrene products.

Unipod® is a company driven by continuous improvement and innovation. With state-of-the-art EPS manufacturing facilities, Unipod® has the ability to deliver innovative product solutions for our customers.

Unipod® is the only EPS manufacturer in Australia that is fully ISO 9001 certified. Together with our industry first, complete product traceability system and our customer portal- Foam hub, Unipod® proudly continues to lead the Australian EPS industry in providing innovation, quality,

consistency, visibility and continuous improvement in all EPS products that we manufacture, including the Unibloc Geofoam® Compressible Inclusion product.

Unipod® is committed to working with our customers to deliver high quality, creative solutions to civil construction problems. Contact us and see how our innovative approach using Unibloc Geofoam® Compressible Inclusions in civil building construction can help you.

Unipod® can also provide quick, reliable and easy delivery of the Unibloc GeoFoam® Compressible Inclusion blocks directly to site. With our wealth of experience, we can advise and answer all your questions and queries. Simply contact our sales team to speak to a Unibloc GeoFoam® Compressible Inclusions consultant today.

Foamhub®

Foamhub® is a unique, Unipod developed, online tool that gives the user direct access to all segments of their Unipod® account, at any time.

This tool allows the user to download all documents related to their account in real-time, enabling full visibility of valuable customer information such as invoices, pricing, test results, delivery dockets & schedules, etc. The user has access to track their Unitherm® order from entry, through manufacturing, to proof of delivery with photos taken on-site via our exclusive traceability program.

Unipods® Unitherm® “Quality Conformance certificate” is available on Foamhub® for every order and verifies that the Unitherm® product supplied by Unipod®, conforms to all relevant Australian and International standards.

Unipod can adapt and customise the access and permissions for each user to their individual account to meet their unique requirements and most importantly, Foamhub® is 100% free and provided as part of Unipods® superior customer service experience, with Unipod® being the only EPS products manufacturer in Australia, that can provide this fully integrated service.

FOAMHUB®

Safety & the Environment

At Unipod®, the health and safety of our employees and all our stakeholders is of paramount importance. Unipod is committed to maintaining the highest standards of operation. Our ISO 9001 accredited management system ensures that well developed work practices, controls and risk mitigation strategies are inherent considerations in all our daily operations.

Unipod® continues to evolve and develop to meet our customers' ever-changing needs through the adoption of measurable quality assurance protocols and a cycle of continuous improvement that ensures minimum quality and service standards are not only able to be consistently met but are routinely exceeded. Primary issues that are considered at all times:

- **Risk mitigation through the development and adherence to safe work practices.**
- **Effective incident management and prevention strategies.**

Unipod® is focused on being a responsible corporate citizen, ensuring that we meet all our environmental responsibilities. Its environmental sustainability and environmental protection strategies are centred around the recycling of EPS and other EPS manufacturing derived waste, waste management and waste reduction outcomes.

The manufacture of Unipod® EPS products is a low pollution process. Steam is the key ingredient in all the EPS products Unipod® manufactures. The water consumed to produce the steam is recovered and reused many times. Furthermore, there is no waste in the production of Unipods® EPS products as all off cuts and rejects can be re-used or recycled. Unipod® has established EPS recycling facilities within its state-of-the-art Truganina manufacturing plant in Melbourne and offers all its customers the convenience of drop off or pick up, of clean EPS waste from its project sites.

Quality Assurance

Unipod® maintains ISO 9001 accreditation. In doing so Unipod® acknowledges that effective leadership, communication and personal engagement are fundamental pillars to not only our business model but are also key aspects towards the ongoing retention of our ISO accreditation. Therefore, customers can be assured of our continuous commitment to driving ongoing quality assurance in all aspects of the business, especially our product manufacture and our customer service delivery.





Unibloc GeoFoam® Compressible Inclusion 20-year Limited Product Warranty

Unipod® Pty. Ltd. is the manufacturer of the Unibloc GeoFoam® Compressible Inclusion product. This warranty shall apply to the Unibloc GeoFoam® Compressible Inclusion product and shall be read and construed in conjunction with Unipods® standard terms and conditions of sale. In the event of any inconsistency, the provisions in this warranty shall prevail.

Unibloc GeoFoam® Warranty

Unipod® warrants that for a period of 20 years, commencing with the date of delivery (the “Warranty Period”), that the Unibloc GeoFoam® Compressible Inclusion product will maintain 90% of its AS/NZS 1366.3 Compressive Resistance as tested at 10% strain.

If during the Warranty Period, the Unibloc GeoFoam® Compressible Inclusion is determined by sampling and testing in the manner described below not to meet warranty value, Unipod® will, subject to the clauses set out below, either deliver to the owner of the project on which the Unibloc GeoFoam® Compressible Inclusion was initially installed (“Owner”), a quantity of equivalent Unibloc GeoFoam® Compressible Inclusion (EPS block) product to replace the non-performing Unibloc GeoFoam® Compressible Inclusion or, at Unipods® sole discretion, refund to the Owner, the original purchase price of the non-performing Unibloc GeoFoam® Compressible Inclusion.

Sampling & Testing

All sampling shall be conducted in accordance with sampling procedures prescribed by Unipod®. Samples of the Unibloc GeoFoam® Compressible Inclusion shall only be taken in the presence of an authorised Unipod® representative. Testing of Unibloc GeoFoam® Compressible Inclusion samples shall be undertaken in accordance with the requirements of the AS1366.3 test standard. Unibloc GeoFoam® Compressible Inclusion samples shall be conditioned to equilibrium prior to testing. All sampling and testing costs (including but not limited to costs of the Unibloc GeoFoam® Compressible Inclusion covering removal and replacement) shall be at the Owner’s sole expense. Owner agrees to be bound by and shall not dispute the findings and conclusions of the sampling and testing.

Warranty Conditions

Unipods® obligations under this warranty will only take effect if the Unibloc GeoFoam® Compressible Inclusions were correctly installed by a skilled and experienced installer in accordance with the product installation recommendations and guidelines issued by Unipod®. This warranty shall be void if, in Unipods® sole judgment, the Unibloc® Compressible Inclusion performance has been impaired by either damage, abuse or alterations to the Unibloc GeoFoam® Compressible Inclusion where such alterations were made without the prior written approval of Unipod®.

Warranty Exclusions

Unipod® does not warrant the compatibility of any other product/s (including but not limited to any geotextiles or geomembranes or coatings) with the Unipod GeoFoam® Compressible Inclusion. It is the Owner’s sole responsibility to consult with a fully qualified geomembrane or geotextile engineer as to product compatibility with the Unibloc GeoFoam® Compressible Inclusion product and the correct installation thereof.

To the full extent permitted by law, Unipod® shall have no liability whatsoever in contract, tort, law or otherwise for any loss or damage arising directly or indirectly out of or in relation to the use of any incompatible product (including but not limited to any geotextiles or geomembranes or coatings) with Unibloc GeoFoam® Compressible Inclusion.

1. To make a warranty claim, the owner must provide the following information:

- (a)** The details of the Unibloc GeoFoam® Compressible Inclusion product purchased. (Application dates, product batch numbers and quantities must be recorded and supplied as a minimum to commence a warranty investigation.)
- (b)** The date and location of the Unibloc GeoFoam® Compressible Inclusion product purchase.
- (c)** A description of the fault observed with the product, providing photographs and samples where possible.

Warranty Exclusions Continued

(d) The contact details of the Owner.

2. The required information can be submitted to Unipod® directly by the following means:

(i) By mail: Unipod® Sales, 2–10 Distribution Dr, Truganina VIC 3029.

(ii) By email: sales@unipod.com.au

3. Unless otherwise agreed to in writing by Unipod®, the Owner shall bear the full expense of claiming the warranty.

4. Where the Owner is a consumer under the Competition and Consumer Act 2010, the benefits given under this warranty are in addition to the statutory rights and remedies available to the consumer under Australian Consumer Law. Our goods come with guarantees that cannot be excluded under Australian Consumer Law.

You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

5. There are no warranties and/or guarantees which extend beyond the terms and provisions as set forth in this warranty document. The warranty shall not be extended or altered except by written instrument as signed by an authorised Unipod® representative.

Unipod® pursues a policy of continuous improvement in the design and performance of its EPS products. The right is therefore reserved to vary specifications without notice.

6. To the full extent permitted by law, the liability of Unipod® for any defect or a breach of the Owner's statutory rights are limited solely to any one or more of the following as determined by Unipod® in its sole discretion, namely:

(i) The supply of replacement product.

(ii) A refund of the purchase price of the product.

7. Except as expressly provided in this warranty, to the full extent permitted by law, Unipod® shall not be liable to the Owner in contract, tort, law or otherwise howsoever and whatever the cause thereof, for the following:

(i) Any loss of profit, hire, business contracts, revenues or anticipated savings, financial or economic loss, loss of opportunity or

(ii) Damage to the Owner's reputation or goodwill, or

(iii) Any loss resulting from any claim made by any third party, or

(iv) Any special, indirect or consequential loss or damage of any nature whatsoever, and none of these shall be included in any direct damages claim.

References

1. AS 1366.3-1992 Rigid cellular plastics sheets for thermal insulation - Rigid cellular polystyrene - Moulded (RC/PS - M)
2. ASTM International 100 Barr Harbor Drive, West Conshohocken, PA. USA
3. ASTM D5321 Standard Test Method for Determining the Coefficient of Soil and Geosynthetic friction by the direct Shear method.
4. ASTM D6817 Standard Specification for Rigid Cellular Polystyrene Geofoam.
5. ASTM D7180-05 Standard Guide for Use of Expanded Polystyrene (EPS) Geofoam in Geotechnical Projects.
6. Expanded Polystyrene Geofoam Applications and Technical data. The EPS Industry Alliance, 1298 Cronson Boulevard, Crofton MD. USA.
7. Foam Control Geofoam Tech Bulletin Nos 5008 and 5009. AFM Corporation Lakeville, Minnesota, USA

Website References

1. www.fhwa.dot.gov/crt/lifecycle/geofoam.cfm Website of the USA Federal Highway Administration's Research and Technology Program.
2. www.geofoam.syr.edu Website of The Geofoam Research Centre at Syracuse University USA

Appendix

Appendix 1





Unipod®

The Unibloc Geofoam® Compressible Inclusion product is proudly manufactured and distributed in Australia by Unipod® using some of the most technologically advanced and largest EPS block machinery in the world. Unipod® works closely with its international partner, AFM Corporation in the United States, to deliver tested and proven Geofoam products to the Australian market, that assure high-performing solutions for the Australian civil construction industry.

In addition to the Unibloc Geofoam® Compressible Inclusion product, Unipod® also manufactures and supplies a number of other innovative EPS moulded and cut products including:

- Unitherm® Underslab Insulation
- Unipod® Waffle Pods
- Unipoly® EPS Block / Panel
- Marine Pontoons
- Profile cutting

Proud Licensee of:



Unipod® is a progressive moulded polystyrene manufacturing and recycling company, founded in 2007, Victoria Australia. The plant's machinery and equipment are custom designed and built, making the plant a state-of-the-art operation, and Unipod® the market leader in product quality, design flexibility and overall service.

2-10 Distribution Drive,
Truganina, Vic 3029 Australia
(Enter via foundation road)

1800 486 4763
info@unipod.com.au

