Unitherm®

Underslab Insulation

Technical Product Brochure





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In order to meet the ever-changing needs of its valued clients and the market, Unipod[®] continually tests, validates and improves its Unitherm[®] product range. As a function of this, the information contained in the Unitherm[®] 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[®] Unitherm[®] technical product brochure.

Contents

Product Overview	4
Case Study	6
Physical Properties	7
Design Considerations	8
Our Service Commitment	14
Warranty	16
References	17

Superior moisture resistance and stable R-value to protect insulation integrity.



Unitherm

Overview

Unipod Unitherm[®] is a cost-effective, durable and energy efficient solution for insulation applications. It is the ideal material to stop energy loss at the foundation slab.

Unitherm[®] is made from Unipoly[®], a light-weight moulded Expanded Polystyrene (EPS) material with exceptional thermal insulation properties. Unitherm[®] exceeds Australian standard AS1366 Part 3, 'Standard Specification for Rigid, Cellular Expanded Polystyrene'.

How does Unitherm[®] work?

The advanced technology used in the manufacture of Unitherm[®] results in a unique material that is comprised of 97% stabilised air by volume captured within a 3% cellular Polystyrene matrix.

It is this highly stabilised and rigid cellular structure that provides Unitherm[®] with its unique set of attributes, those being very high compressive strength, controlled dimensional stability, light weight nature and overall structural rigidity.

Applications

- Underslab Insulation
- Under Floor Thermal Barrier
- Under Floor Footings
- Residential Slabs
- Factory Floors
- Refrigerated (Cool) Rooms

Key Benefits

The Unitherm[®] Unipoly[®] product, when installed as an underslab construction material, offers builders and installers a number of key benefits including:

- Quick and easy installation.
- Lightweight and Safe to handle.
- Delivers a high and stable R-value.
- Will not breakdown over time.



Thermal Efficiency

The insulating performance (R-value) of Unitherm[®] increases with increased panel thickness.

Custom panel sizes are available upon request.

R Value	Product	Thickness
R1.0	Unitherm®	35mm
R1.5	Unitherm®	53mm
R2.0	Unitherm®	70mm
R3.0	Unitherm®	105mm

R Values are calculated on panels only at 23°C.

Insulation Characteristics

As Unitherm[®] panel is comprised of 97% air by volume, EPS is one of the most efficient man made thermally insulating materials available anywhere in the world. Importantly, the thermal resistance (R value) of the Unitherm[®] panels remains consistent over the life of the product due to the rigid cellular structure of the product.

Ageing has no effect on the insulation performance of the Unitherm® panels. As such, EPS insulation products such as Unitherm® have been used in residential and commercial building construction in ceilings, walls and floor systems etc, for many years.

How Burbank Urban achieved greater energy efficiency in 155 homes.

Burbank Urban

Brickworks Precinct

Recent research undertaken in Australia indicates that depending on several factors, up to 49% of heat may be lost to the ground through the concrete slab of your home or commercial building construction.

The Brickworks project called for a raft slab to be constructed due to the soil conditions. Burbank Urban decided to use Unitherm® as it is one of the most versatile under slab insulation products on the market. Installing Unitherm® as part of the slab construction helped improve the slab's thermal efficiency, which assisted in achieving the minimum 6-star Building Code of Australia (BCA) mandated energy rating requirements.



Project Outcomes

- Unitherm[®] Underslab Insulation
 installed in 155 homes
- **17,307** square meters of EPS sheet
- **5,769** sheets manufactured and delivered
- 241 blocks manufactured
- 12 month supply period



Physical Properties

Unitherm[®] meets or exceeds the requirements of Australian Standard AS 1366.3 and the American Standard Test method ASTM D6817" Standard Specification for Rigid, Cellular Expanded Polystyrene.

Unipod[®] conducts routine, rigorous testing of its Unitherm[®] product to ensure quality is maintained to these standards.

Physical Property	Unit of measure	Class of EPS	Test Method
Unitherm® Grade		X30	
Nominal density	Kg/m³	30	ISO 845
Compressive Stress at 1% deformation (min.)	kPa	64	AS 2498.3
Cross-break Strength (min.)	kPa	360	AS 2498.4
Rate of water vapour transmission (max.) parallel to rise at 23°C	µg/m²s	400	AS2498.5
Dimensional stability of length, width, thickness (max.) at 70°C, dry condition seven days	Percent	1	AS 2498.6
Thermal resistance (R-value) at a mean temperature of 23°C (50mm thick sample)	m²K/W	1.43	AS 2464.6
Thermal conductivity (k) measured at 23°C	W/mK	0.035	AS 2464.5
Flame propagation characteristics:			
– Median flame duration (max.)	Seconds	2	
– Eight value (max.)	Seconds	3	AS 2122.1
– Median volume retained (min.)	Percent	50	
– Eight value (min.)	Percent	47	
Buoyancy Force	Kg/m ³	971	

As per Australian Standard AS 1366.3, 1992

As per the American Standard Test Method ASTM D6817

Physical Property	Unit of measure	Class of EPS	Test Method
Unitherm® Grade		X30	
Compressive Stress at 1% deformation (min.)	kPa	75	ASTM D6817
Elastic Modulus (min.)	kPa	7500	ASTM D6817

Product Stability

Unitherm[®] being made from EPS is an inert, inorganic material that will not rot and is resistant to mould, mildew and fungi. The Unitherm[®] panels are non-toxic, odourless and non-irritating to the skin or eyes. They contain no HCFCs and are safe for the environment. Furthermore, the Unitherm[®] panels offer no nutritional value to most insects, animals and plants 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 a permanent long-life solution.

The Unitherm[®] panels 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.

Load Distribution: (Poisson's Ratio)

The Poisson's ratio for Unitherm[®] is approximately 0.12 within the elastic range.

Compressive Resistance

Unitherm[®] EPS is a low density, high strength-to-weight ratio material that has the capacity to withstand and dissipate large forces. Its rigid cellular structure provides tremendous structural integrity. EPS behaves as a linear elastic material up to a strain rate of approximately 1%.

Thus, the design recommendation for Unitherm[®], is to limit load bearing capacity to the maximum compressive resistance as measured at 1% strain. The resultant stress as measured at a compressive strain rate of 1% is called the elastic limit stress.

Creep Behaviour

The as tested creep behaviour of Unitherm® EPS is minimal at strain levels below 1%. The effects of creep significantly increase at higher strain rates of 5% and 10% as typically tested however. This is one of the primary reasons for using a compressive resistance at maximum 1% strain for load bearing design applications of Unitherm®



Stress-strain relationship for Unitherm® EPS

Strain Percentage (%)



Protection From Exposure To Fire

Unitherm[®] panels 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 Unitherm[®] product is intended to be used, appropriate precautions should be implemented on site.

The Unitherm[®] panels 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 Unitherm[®] panels will be fully protected from fire or open flame exposure by the concrete slab.

UV Light Exposure

EPS is susceptible to ultra-violet (UV) degradation if exposed to direct sunlight for long periods of time. It is recommended that in areas of high UV concentration, or where the Unitherm[®] panels may be exposed to direct sunlight for extended periods of time (weeks or months) that where ever possible, the Unitherm[®] panels 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 Unitherm[®] panels, if they are intended to be on site for prolonged periods of time prior to installation.

Wind Exposure

Due to the lightweight nature of the Unitherm® panels, exposure to high winds should be avoided. Where possible, installation and/or movement of the Unitherm® panels 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 Unitherm[®] panels once the panels have been installed in place.

Chemical Exposure

Unitherm[®] panels are chemically resistant to most water-based materials. Resistance to diesel fuel, paraffin oils and vegetable oils however is limited, thus prolonged contact should be avoided.

Unitherm[®] EPS will however be attacked by hydrocarbons, ketones, esters and solvents. Exposure to these chemicals should be completely avoided.



Product Handling and Storage

The Unitherm[®] panels should be stored elevated, under cover and laid flat. Edges and corners of the panels are to be protected at all times. Prolonged exposure to the elements should be avoided, including exposed edges.

Product Sustainability

Where Unitherm[®] EPS panel off cuts are generated on site, Unipod[®] offers a clean EPS recyclable waste pick up and drop off service for all its clients. The waste Unitherm[®] EPS panel off cuts, can then be recycled into a variety of differing Polystyrene products and applications such as picture frames, and lightweight concrete amongst other products.



Unipod® Quality Assurance

Unipod® proudly 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 9001 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..





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Safety and 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. Some of the primary issues that are considered at all times are:

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

Unipod[®] is focused on being a good 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 that Unipod® manufactures. The water consumed to produce the steam is recovered and reused many times. Unipod® EPS is also free from ozone depleting substances in both its manufacture and in its composition and is manufactured without CFCs, HCFCs or HFCs.

The Unipod[®] range of EPS building products are highly energy efficient. The energy saved over the lifetime of the Unipod[®] Unitherm[®] panels in reduced heating demand, more than compensates for the raw material used in their production. The effective application of EPS insulation can cut carbon dioxide emissions by up to 50%. The energy used in its manufacture may be recovered within six to twelve months by the energy saved in the buildings when EPS is used to insulate the building depending on the building design and the climatic conditions.



EPS recycling & raw material management

Recycling saves money, energy and significantly reduces the impact of a given product on the environment. Again, contrary to popular belief, EPS is 100% recyclable and is one of the most easily recycled of all the insulating materials used in building and construction and aligns with the "cradle to cradle (C2C)" principle.

Unipod[®] has heavily invested in EPS recycling equipment and recycles all its own EPS off cuts for reuse. Unipod[®] also collects clean EPS waste from Waffle Pod users as well as recycling a range of EPS items from commercial recyclers who separate EPS from other waste streams. These products are recycled by Unipod[®] and the recyclate is then reused in the manufacture of other Unipod[®] EPS products.

Even the EPS dust that is generated from the Unipod® EPS recycling process, is collected, compacted and sold as a raw material feed stock to companies that manufacture items such as replacement hardwood decking, garden furniture, picture frames and coat hangers. EPS waste can also be mixed with concrete to produce building products such as prefabricated light weight concrete blocks. The manufacture of these products uses 100's of tonnes of recycled EPS material each year. Unipod[®] also uses integrated chain management principles in the manufacture of its EPS products. This includes manufacturing EPS products in optimum shapes and sizes for minimal use of raw material, reuse of cut-offs during production and inclusion of post-consumer waste EPS. Unipod[®] continues to promote the use of recycled polystyrene in a wide variety of end use applications. For more recycling information, contact the Unipod[®] sales force. Refer to the back page of this brochure for contact details

The recycling of EPS material by Unipod®, helps to positively manage the end of life outcomes of EPS manufactured products. Similarly, Unipod is also highly focused on achieving positive outcomes at the front end of EPS product manufacture and the minimisation /elimination of EPS raw material waste, from within its manufacturing process. Due to the very small and lightweight nature of individual EPS beads, the material handling and control of the raw material during manufacture is paramount in ensuring that none of the material inadvertently escapes into the external atmosphere, where it can end up in our water ways.

Unipod[®] being the only ISO 9001 Quality assured EPS product manufacturer in Australia, also prides itself on being an environmentally responsible corporate citizen, maintaining some of the strictest



material handling protocols within the Australian EPS industry. Our independently audited work procedures and practices, ensure that all aspects of raw material handling and processing are undertaken in a highly controlled manner, resulting in the near zero volume release of any raw EPS material escaping out into the external environment.

Therefore, whatever your packaging or insulation requirement, you can be sure that with Unipod® EPS, you are making the right choice for your business and for the environment.





Our Service Commitment



Sales & Service

You can have full confidence in the long-term sales and service of the Unitherm[®] product because it is proudly designed and manufactured 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-theart 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 Unitherm[®] product.

Unipod[®] is committed to working with our customers to deliver high quality, creative solutions to construction problems. Contact us and see how our innovative approach using Unitherm[®] in building slab construction can help you.

Unipod[®] can also provide quick, reliable and easy delivery of the Unitherm[®] panels directly to site and with our wealth of experience, we can advise and answer all your questions and queries. Simply contact our sales team to speak to a Unitherm[®] consultant today.

Foamhub®

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

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® customer service experience, with Unipod® being the only EPS products manufacturer in Australia, that can provide this fully integrated service.

FOAMHUB



Unitherm® 10 Year Limited Product Warranty

Unipod® Pty. Ltd. is the manufacturer of the Unitherm® product. This warranty shall apply to the Unitherm® 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.

Unitherm® Warranty

Unipod[®] warrants that for a period of 10 years, commencing with the date of delivery (the "Warranty Period"), that the Unitherm[®] product will maintain 90% of its ASTM D6817 Compressive Resistance as tested at 1% strain using the D1621 test method. If during the warranty Period, the Unitherm[®] product 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 Unitherm[®] was initially installed ("Owner"), a quantity of equivalent Unitherm[®] product to replace the non-performing Unitherm[®] or, at Unipods[®] sole discretion, refund to the Owner, the original purchase price of the non-performing Unitherm[®]

Sampling & Testing

All sampling shall be conducted in accordance with sampling procedures prescribed by Unipod[®]. Samples of the Unitherm[®] shall only be taken in the presence of an authorised Unipod[®] representative. Testing of Unitherm[®] samples shall be undertaken in accordance with the requirements of the ASTM D6817 test standard. Unitherm[®] samples shall be conditioned to equilibrium prior to testing. All sampling and testing costs (including but not limited to costs of Unipod[®] 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 Unitherm® was 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 Unitherm® performance has been impaired by either damage, abuse or alterations to the Unitherm® product 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 various coatings and chemicals) with the Unitherm[®] product.

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 chemicals or coatings) with the Unitherm[®] product.

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

(a) The details of the Unitherm[®] 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 Unitherm[®] product purchase.

(c) A description of the fault observed with the product, providing photographs and samples where possible.

(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.

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

major **1.** AS 1366.3-1992 Rigid cellular plastics sheets for nably

- thermal insulation Rigid cellular polystyrene -MouldedASTM D6817 Standard Specification for Rigid
- Cellular Polystyrene.
- ASTM International 100 Barr Harbor Drive, West Conshohocken, PA. USA

Appendix

References

Appendix 1



Suttle 19, Building U, - The Lakes Centre', a-Zz Yung Street, Cabootture QLD 40-1 The certificate of Registration, which remains the property of Si Qual International Py LL, iz Yung Street, Si Qualations governing the certification scheme operated Si Qual International Py LL and in respect of goods or service described in the schedule hereto, bearing the same number as this certificate.

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.



Unipod®

Unitherm[®] is manufactured in Australia by Unipod[®] using the world's largest and most technically advanced EPS block moulding machinery.

In addition to the Unitherm® Underslab Insulation product, Unipod® also manufactures and supplies:

- Unibloc Geofoam®
- Unipod[®] Waffle Pods
- Unipoly[®] EPS Block / Panel
- Marine Pontoons
- Profile cutting

Unipod[®] is a progressive moulded polystyrene manufacturing and recycling company, founded in 2007, in 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









