QUINN LITE PAC

PRODUCT GUIDE

CONTENTS

INTRODUCTION

Quinn Lite Pac, Granard, Co. Longford was founded in 1975 to produce and distribute expanded polystyrene thermal insulation products for the construction industry.

A large proportion of this product is used in the insulating of cavity walls, floors and roof insulation of commercial, industrial and domestic buildings.

The Quinn Group purchased the Company in 1994 and in August 2001 Quinn Lite Pac commissioned a new 7000m^2 production facility at the same location.

The products are used for many applications other than thermal insulation. These include void formers for bridge decks, flotation units for marinas, packaging and lightweight fill for road construction.

Quinn Lite Pac, is committed to quality and innovation. The company was one of the first manufacturers of Expanded Polystyrene to achieve EN ISO 9001:2008 certification for manufacturing and distribution.

The introduction of the High Performing Pearl Product in 2004 confirmed Quinn Lite Pac as one of Ireland's leading suppliers of Expanded Polystyrene for construction.

Quinn Lite Pac

REQUIREMENTS

All Quinn Lite Pac products are manufactured under an IS EN ISO 9001 certified system.

Quinn Lite Pac EPS and Quinn Lite Pac Pearl are covered by Irish Agrément Board and BBA certificates:

- IAB050028 Quinn Lite Pac EPS and Quinn Lite Pac EPS Pearl Under Floor Insulation Systems
- BBA05/4278 EPS Quinn Lite Pac Pearl and Quinn Lite Pac EPS Underfloor Insulation

Quinn Lite Pac insulation products are manufactured in accordance with EN 13163:2008 'Thermal insulation products for buildings. Factory made products of expanded polystyrene'.

TECHNICAL DESCRIPTION

Composition

Quinn Lite Pac EPS and Quinn Lite Pac EPS Pearl are manufactured by using steam to expand polystyrene beads to approximately forty times their original size. As the beads expand they bond and can then be moulded to the required shape. Quinn Lite Pac Pearl is manufactured using advanced EPS polymers which offer improved thermal performance.

Quinn Lite Pac is available in six grades: EPS Pearl, 70/100, EPS 70, EPS 100, EPS 150 and EPS 200

DIMENSIONS

Quinn Lite Pac products are available in various thickness and sizes see table 01.

Table 01 Quinn Lite Pac EPS board sizes

Thickness (mm)	Length and width (mm)	Boards per pack	Pack depth (mm)	m²/board	m²/pack
Cavity Wall					
65	1200 x 450 (Pearl)	18	585	0.54	9.7
Plain Board					
12.5	1200 x 600	48	600	0.72	34.6
19	1200 x 600	32	608	0.72	23.0
25	1200 x 600	24	600	0.72	17.3
40	1200 x 600	15	600	0.72	10.8
50	1200 x 600	12	600	0.72	8.6
75	1200 x 600	8	600	0.72	5.8
100	1200 x 600	6	600	0.72	4.3
Plain Board					
12.5	2400 x 1200*	48	600	2.88	138.2
19	2400 x 1200*	32	608	2.88	92.2
25	2400 x 1200*	24	600	2.88	69.1
40	2400 x 1200*	15	600	2.88	43.2
50	2400 x 1200*	12	600	2.88	34.6
75	2400 x 1200*	8	600	2.88	23.0
100	2400 x 1200*	6	600	2.88	17.6

* In UK these boards are supplied in half packs. Other sizes available on request.

Quinn Lite Pac
Performance

PERFORMANCE

Table 02 shows the compressive strengths, measured at 10% compression, of the grades of Quinn Lite Pac Pearl and Quinn Lite Pac EPS.

THERMAL PERFORMANCE

Quinn Lite Pac has a thermal conductivity between 0.031 W/mK and 0.038 W/mK depending on grade (see table 03). Table 02 shows the thermal resistances for given thicknesses. Because the thermal performance is provided by air in the cellular voids the material retains its insulating performance throughout its service life.

CONDENSATION

Quinn Lite Pac has a high vapour resistivity which makes the material effective in preventing the deposition of surface condensation and interstitial condensation.

FIRE

Quinn Lite Pac EPS 70 is class F which is suitable for most applications. This is also available in class E along with Quinn Lite Pac other grades, contains a flame-retardant additive (FRA) which makes them more difficult to ignite.

BIOLOGICAL

Quinn Lite Pac boards are rot proof and unaffected by mould or fungi. They do not support insects or vermin.

ENVIRONMENTAL

Quinn Lite Pac insulation is manufactured without the use of any ozone depleting gases such as CFCs and HCFCs. It is insoluble in water and will not contaminate ground water.

COMPATIBILITY

Quinn Lite Pac boards are not compatible with solvents or materials such as timber preservatives, coal tar, pitch or creosote which contain volatile organic compounds (VOCs).
Quinn Lite Pac boards must not be installed in contact with PVC covered cables.

PVC sheathing on cables can degrade if in contact with polystyrene so must be isolated from Quinn Lite Pac EPS boards.

Hot water pipes should not be installed in contact with Quinn Lite Pac EPS boards.

DURABILITY

When correctly installed, Quinn Lite Pac boards have a service life comparable to that of the building.

Table 02 Thermal resistance of Quinn Lite Pac Pearl and Quinn Lite Pac EPS

	Thermal resistance (m^2K/W)				
Thickness (mm)	**EPS Pearl**	**EPS 70**	**EPS 100**	**EPS 150**	**EPS 200**
25	0.806	0.658	0.694	0.694	0.735
50	1.613	1.316	1.389	1.389	1.471
75	2.419	2.974	2.083	2.083	2.206
100	3.226	2.631	2.778	2.857	2.941

Measured to EN 12667 and EN 12939

Table 03 Performance

		Grade				
Property	Standard	**EPS Pearl**	**EPS 70**	**EPS 100**	**EPS 150**	**EPS 200**
Compressive Strenght at 10% deformation (kPa)	EN 826	70/100	70	100	150	200
Bending strength (kPa)	EN 12089	115/150	115	150	200	250
Dimensional stability	EN 1604	DS (N) 5				
Thermal conductivity (W/mK)	EN 12667 / EN 12939	0.031	0.038	0.036	0.035	0.034
Water vapour diffusion factor, Q	EN 12086	20 - 40/30-70	20 - 40	30 - 70	30-70	40 - 100
Water vapour permeability, ∂ (mg/PaNM)	EN 12086	0.019 – 0.06/ 0.024 - 0.010	0.018 – 0.036	0.010 – 0.024	0.10 - 0.024	0.007 – 0.018
Long term water absorption – total immersion - partial immersion	EN 12087	WL (T) 05 (less than 5%) less than 1 %				

Quinn Lite Pac
Floors - general

High performance floor insulation limits heat loss through the floor, controls the occurrence of surface and interstitial condensation; it avoids cold spots so ensuring the comfort of building users.

Quinn Lite Pac EPS can be used to insulate groundbearing concrete floors above or below the slab and be used to upgrade existing timber floors.

The optimum position of the insulation in a groundbearing slab construction is influenced by the heating regime and the required thermal performance:

- insulation sited below the slab will give a slow thermal response, suitable for buildings which will be continuously heated;
- insulation sited above the slab will give a rapid thermal response, suitable for buildings which will be intermittently heated.

GENERAL CONSIDERATIONS

Loading

The correct grade of Quinn Lite Pac EPS should be specified to withstand the anticipated loading:

- domestic floors – EPS 70 Pearl;
- commercial floors – EPS 100 Pearl/ EPS 100/EPS 150
- cold store floors – EPS 200.

Quinn Lite Pac recommend designers consult a structural engineer to ensure the proposed floor design will withstand the predicted loads.

THERMAL PERFORMANCE

The thermal performance of groundbearing floors depends upon the floor construction and the dimensions of the floor expressed as the ratio of the perimeter to the area (P/A). Table 04 shows the thickness of insulation required to achieve specified U-values for P/A ratios.

THERMAL BRIDGING

Floors should be designed to avoid thermal bridging at the floor/ wall junction. Constructions with the insulation beneath the slab or screed should have vertical edge insulation extending from the base of the Quinn Lite Pac floor insulation to immediately below the floor finish. The insulation in the wall construction should extend down to the level of the base of the slab.

RADON PROTECTION

All floors must include a radon barrier which extends across the whole footprint of the building. A suitable damp-proof membrane (DPM) can function as a radon barrier: it must be continuous and sealed to a radon-proof DPC at walls. Detailed guidance on radon protection can be found in Radon: guidance on protective measures for new dwellings:

Table 01 Quinn Lite Pac EPS board sizes

Thickness (mm)	Length and width (mm)	Pack depth (mm)	m²/board	m²/pack
Plain Board				
12.5	1200 x 600	600	0.72	34.6
19	1200 x 600	608	0.72	23.0
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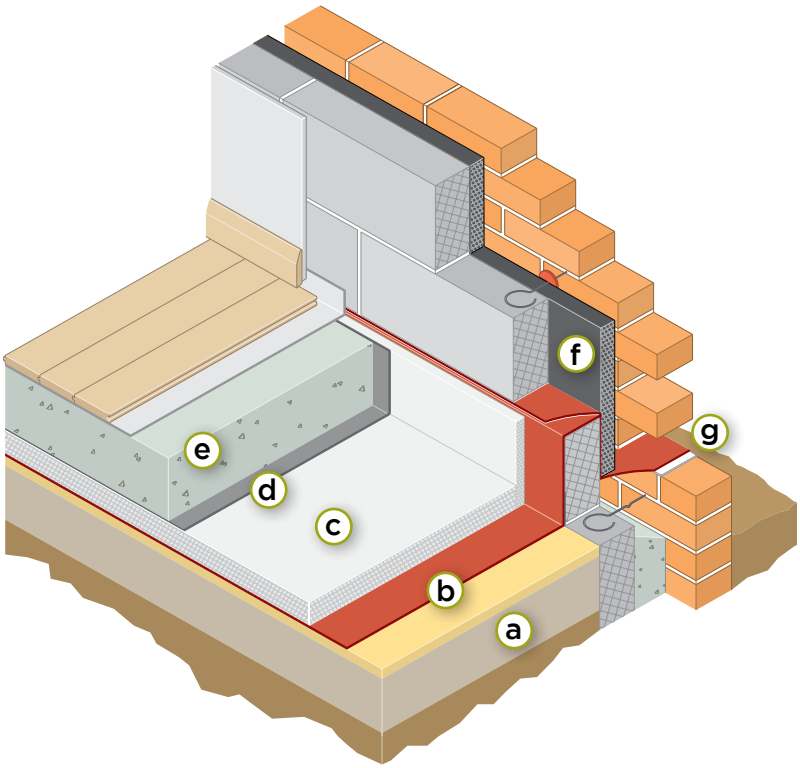
* In UK these boards are supplied in half packs. Other sizes available on request.

Quinn Lite Pac
Floors - Insulation below the slab



KEY FOR DIAGRAM

- a Hardcore with sand blinding
- b Damp proof membrane/ Radon barrier insulation board.
- c Quinn Lite Pac Insulation
- d Damp proof course
- e Concrete Slab
- f Quinn Lite Pac Pearl Insulation [in wall cavity]
- g Damp proof course/ Radon barrier

Design notes

Avoid thermal bridging at the floor/wall junction by ensuring the wall insulation starts at the same level as the base of the floor insulation.
Ensure the radon barrier covers the whole footprint of the building and is carried across the wall cavity.

Installing Quinn Lite Pac EPS below the slab offers a straightforward construction sequence which brings the whole of the floor structure within the insulated envelope.
The appropriate grade of Quinn Lite Pac EPS should be determined from the predicted loading.

The insulation should be laid on a DPM, which is laid on top of the blinded hard core. The perimeter of the floor should have vertical edge insulation at least 25mm thick. At party walls edge insulation should be provided on both sides of the wall.

Quinn Lite Pac EPS should be fitted tightly around services rising through the slab, but must not be in direct contact with hot water pipes or PVC covered cables.

INSTALLATION

1. Level the surface of the hardcore with a blinding of clean sand. Ensure finished deflection is less than 35mm over 3m.
2. Lay the damp-proof membrane (DPM). Lap joints by 300mm and seal. Lap and seal with the damp-proof course (DPC): with joints lapped 300mm and sealed. Take up to the DPC and seal.
3. Fit Quinn Lite Pac EPS against perimeter walls to form edge insulation. The insulation should be deep enough to reach the top of the slab.
4. Lay Quinn Lite Pac EPS boards in broken bond. Butt boards tightly together and to edge insulation.
5. Lay the floor slab and screed.

NOTES

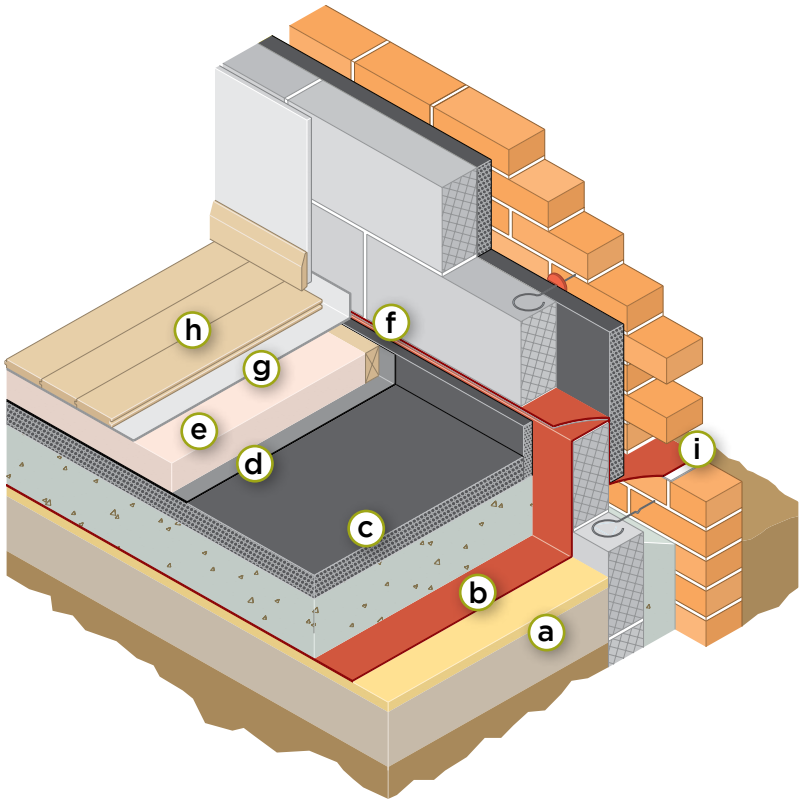
- At service penetrations cut Quinn Lite Pac EPS neatly to fit.
- Protect exposed edge insulation at surface of slab until it is covered by skirting and/or wall plaster.
- Use barrow boards when laying the slab to prevent damaging to the insulation.
- Ensure Quinn Lite Pac EPS boards in the wall extend below the level of floor insulation.

Quinn Lite Pac EPS can be laid above the slab and covered with a screed or, timber or particle board flooring to give a floor with a rapid thermal response.

Quinn Lite Pac
Floors - Insulation above the slab

KEY FOR DIAGRAM

- a Hardcore with sand blinding
- b Damp proof membrane/ Radon barrier
- c Quinn Lite Pac Pearl Insulation
- d Slip sheet
- e Screed
- f Perimeter batten for fixing flooring
- g Vapour Control Layer
- h Timber flooring
- i Damp proof course/ Radon barrier



Design notes

Avoid thermal bridging at the floor/wall junction by ensuring the wall insulation starts at the same level as the base of the floor insulation.
Ensure the radon barrier covers the whole footprint of the building and is carried across the wall cavity.

The slab must be allowed to dry for as long as possible before the insulation is laid: an uneven slab must be blinded with sand before the Quinn Lite Pac EPS is laid. Any liquid applied damp-proof membrane must be compatible with EPS.

Loadbearing walls should not be built off the screed or Quinn Lite Pac EPS, but must have their own foundations. Where Quinn Lite Pac EPS is covered by a screed, lightweight framed partition walls may be built off the screed; where Quinn Lite Pac EPS is directly beneath the floor finish partition walls must be built off timber battens set on the slab.

Screeds should be at least 65mm thick for domestic loadings and 75mm thick for higher loadings. Where underfloor heating is to be installed in a screed, insulation sited above the slab will improve the responsiveness of the system and reduce unnecessary heating of the slab.

Timber or particle board finishes must be isolated from the insulation by a vapour control layer, such as 1000 gauge polyethylene, lapped, sealed and turned up the wall behind the skirting. At thresholds, base of stairs, and other points where high loads are expected, timber support battens should be installed to prevent excessive compression.

Services should, wherever possible, be laid in ducts or channels in the slab. Any cold water pipes set within the insulation should be securely fixed to the slab.

INSTALLATION

1. Ensure the surface of the floor slab is level (no more than 35mm deflection over 3m) and blind if necessary.
2. Lay the damp-proof membrane (DPM) with joints lapped 300mm and sealed: seal to the damp-proof course (DPC).
3. Fit Quinn Lite Pac EPS against floor perimeter to form edge insulation. The insulation should be deep enough to reach the top of the screed.
4. Lay Quinn Lite Pac EPS boards in broken bond; butt tightly together and to edge insulation.
5. Either:

   a) Pour screed,

   or

   b) Fit vapour control layer and particle board flooring.

NOTES

- At service penetrations cut Quinn Lite Pac EPS neatly to fit.
- Use barrow boards when laying the slab to prevent damaging to the insulation.
- Protect exposed edge insulation at surface of slab until it is covered by skirting and/or wall plaster.
- Ensure Quinn Lite Pac EPS wall insulation extends below the level of floor insulation to prevent thermal bridging.

Quinn Lite Pac
Litevoid Fill

LITEVOID FILL

Constructing roads on compressible soils presents engineering challenges as the road embankment must be designed so settlements take place before the final surface is applied. The challenge is greater where it is not practicable to excavate to a firm substrate,

Where an existing carriageway is being refurbished to repair settlement damage there is a risk the additional load imposed by conventional material will produce further settlement and so exacerbate the problem.

The use of Quinn Lite Pac Litevoid Fill in the embankment as a replacement for heavier granular materials will reduce the load upon underlying compressible soils and so limit settlement.

Litevoid Fill has been successfully used in road embankments, behind bridge abutments to minimise horizontal stresses on the abtument walls and below the foundations of buildings constructed on compressible soil.

PRODUCT DESCRIPTION

Litevoid Fill is manufactured from expanded polystyrene, which has excellent strength to weight properties. It is available in a range of densities (see table 07, page 17). EPS 100 is normally used for lightweight fill applications as it offers the best cost to performance ratio. The standard size for Litevoid Fill blocks is 1.2m x 0.6m x 3m: other sizes can be manufactured to order.

SETTLEMENT REDUCTION

Figure 01 shows a stress-strain curve for a typical soil during a cycle of loading, unloading and reloading.

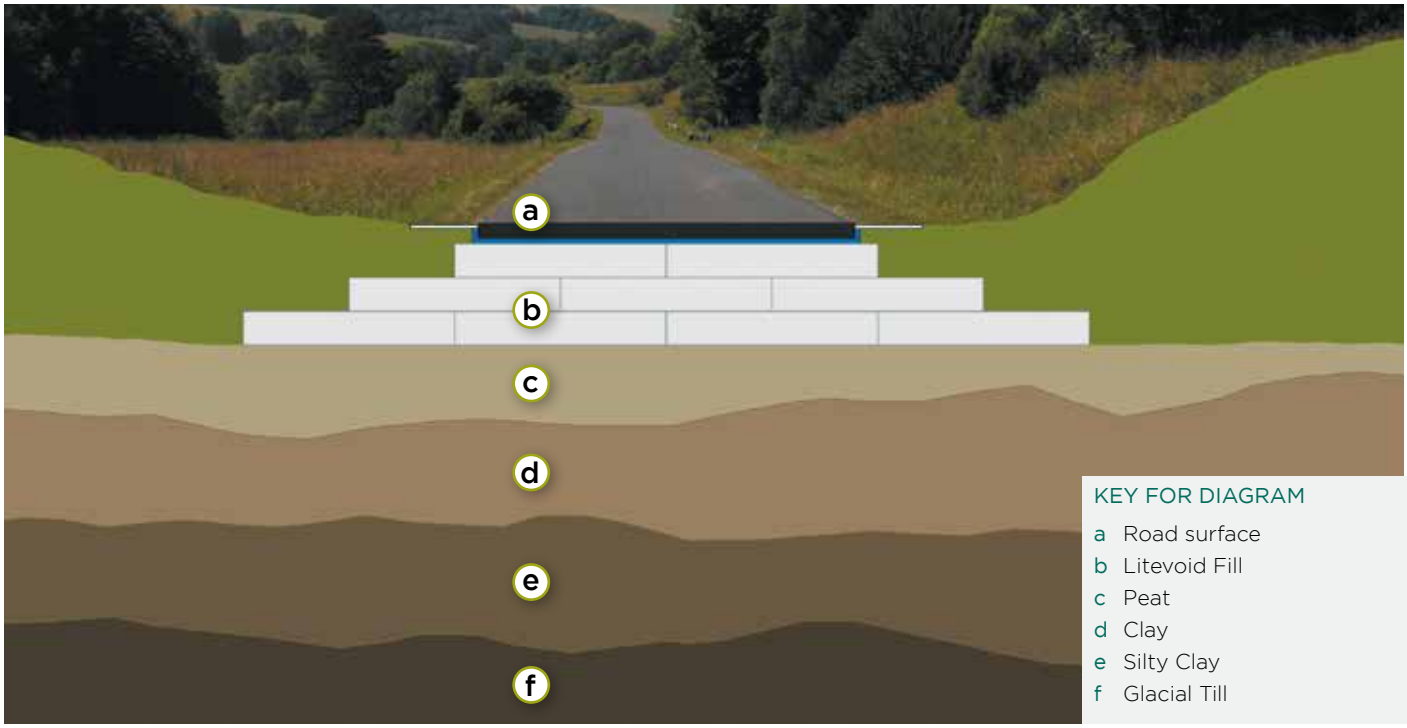
For existing embankments the removal of loading from a soil (unloading phase) and the subsequent reloading phase will only produce small deformations. Litevoid Fill can be used on existing embankments to reduce the load on subsoils whilst maintain the same embankment height.

Where a new road embankment is being constructed on soft soil Litevoid Fill can be used to minimise settlement. A load less than 'A' (see figure 01), will only result in a small amount of settlement; beyond 'A' the predicted settlement increases substantially. Litevoid Fill should be considered as a replacement for conventional fill materials to reduce the amount of settlement.

DESIGN CONSIDERATIONS

Stress in EPS

The fill and road construction above the EPS must be able to distribute the loads imposed by traffic. In order to maintain an acceptable level of loading the Litevoid Fill should be covered either by 150mm concrete slab with mesh reinforcement or 450mm deep granular fill. The pavement should be designed in the normal manner (eg. LR 1132), taking the CBR of the subgrade (concrete or granular fill) to be 5%.



Quinn Lite Pac
Litevoid Fill

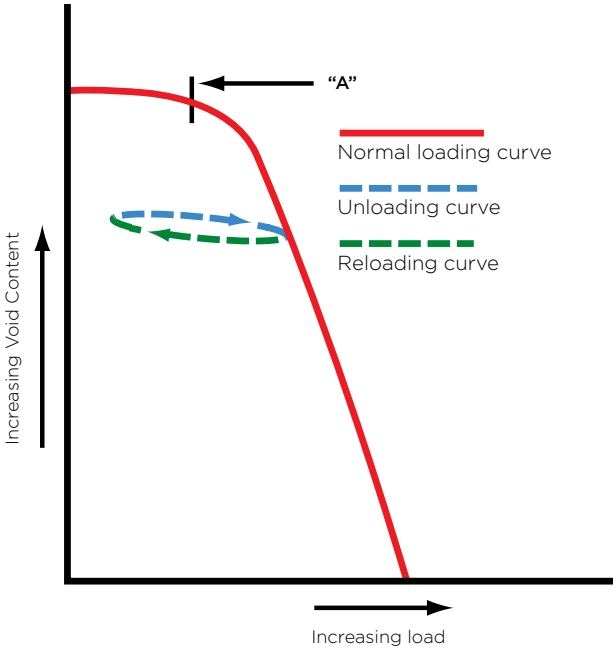


Figure 01 Stress-strain curve for typical soil

Table 07 Density and Compressive strength of Litevoid Fill

	EPS 100	EPS 150	EPS 200
Nominal density (kg/m³)	20	25	30
Compressive strength at 10% strain (kN/m²)	100	150	200

DESIGN DENSITY

EPS 100, the grade most commonly used in lightweight fill applications, has a nominal density of 20kg/m³. When lightweight fill is to be placed underwater the EPS must be loaded sufficiently to over come its natural buoyancy. For buoyancy calculations use a density of 20kg/m³.

EPS does absorb some water when submerged. Whilst the absorbed water does not affect the performance of the EPS it must be considered in load calculations. Research suggests the maximum long term water absorption of EPS is 10% by volume: so for settlement and load calculations the design density should be taken as 120kg/m³.

PROTECTION OF EPS

EPS can be damaged by contact with petroleum and solvents which are commonly carried by road. EPS within a road embankment must be protected from solvents by the equivalent of 1000 gauge polyethylene: in practice two layers of 500 gauge polyethylene are preferred as they can give better lapping.

SITEWORK

Litevoid Fill blocks must be laid on a 50mm deep levelling bed of sand. If water ingress is likely to soften the sand 6mm chippings may be used instead.

Alternate layers of fill should be arranged to stagger joints between blocks thus eliminating any planes of weakness.

HANDLING AND STORAGE

Protect boards from moisture and from prolonged exposure to direct sunlight. Store inside or cover with waterproof sheeting. Restrain against wind uplift.

Store boards away from ignition sources and avoid welding or other hot work where boards are exposed.

Keep boards away from solvents and materials containing VOCs.

Refer to BS 6203:2003 for further guidance on the storage of EPS.

TECHNICAL SUPPORT

Technical support and pack data to be supplied by Quinn Lite Pac.

Quinn Lite Pac Litevoid

LITEVOID

Voids within cast concrete structures may be formed using Litevoid EPS void formers. Litevoid offers many advantages over the use of shuttering to form voids:

LiteVoid speeds up construction by reducing the time required
to prepare voids;

- accurate setting out of the void former is more easily achieved in the factory than on the construction site;
- LiteVoid can be easily adjustable by cutting on site;
- because Litevoid blocks are lightweight there is no need for lifting equipment to manoeuvre them into place.

Litevoid can be supplied in complex shapes, for example for use in the construction of arched bridges, and in blocks up to 4m long. Litevoid formers are manufactured to customer requirements, usually in EPS70 grade, although higher density grades can be used if required.

Contact Quinn Lite Pac for more information on specifying Litevoid.

Quinn Lite Pac Additional information

DELIVERY, STORAGE AND MARKING

Quinn Lite Pac 'EPS' and Quinn Lite Pac 'EPS Pearl' Insulation Systems packs are shrink wrapped in clear/white polyethylene for delivery to site.

Each pack is labelled with the product description, designation code, tolerances, manufacturer's name and brand (product) name, quantity per pack, IAB/BBA identification mark and IAB/BBA Certificate number.

Boards must be protected from prolonged exposure to sunlight and should be stored under cover in their original wrapping or protected with polyethylene. Boards should be stored out of contact with ground moisture and raised above ground level.

Care must be taken to avoid contact with solvents and with materials containing volatile organic components such as coal tar, and timber newly treated with creosote.

The boards must not be exposed to a naked flame or other ignition sources. Handling and storage arrangements must comply with the recommendations of paragraph 8 of BS 6203:2003 'Guide to fire characteristics and fire performance of expanded polystyrene materials (EPS and XPS) used in building applications'.

PRODUCT QUALITY

Quinn Lite Pac Insulation Systems are manufactured to the highest standards, using the most up to date manufacturing equipment. Testing on the finished product is carried on a daily basis in our own laboratory facilities, to ensure compliance with the product standard EN 13163:2012.

HEALTH AND SAFETY

Quinn Lite Pac Insulation Systems are chemically inert, and pose no threat to anyone using it. Quinn Lite Pac Insulation Systems does not contain CFC and HCFC gases and has zero Ozone Depletion Potential. Our boards are not designed to support the weight of a person unless the board is fully supported by a load bearing surface.

FIXINGS

According to the latest guidance (BRE 443 Conventions for U-value calculations) U-value calculations must take account of the thermal bridging effect of high conductivity fixings which penetrate thermal insulation; consequently it is important to select fixings which will minimise bridging. In cavity wall constructions Quinn recommends the use of stainless steel ties.

The management systems of Quinn Lite Pac have been assessed and registered as meeting the requirements if
IS EN ISO 9001:2008 by the National Standards Authority of Ireland (Registration No 19.06281).

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