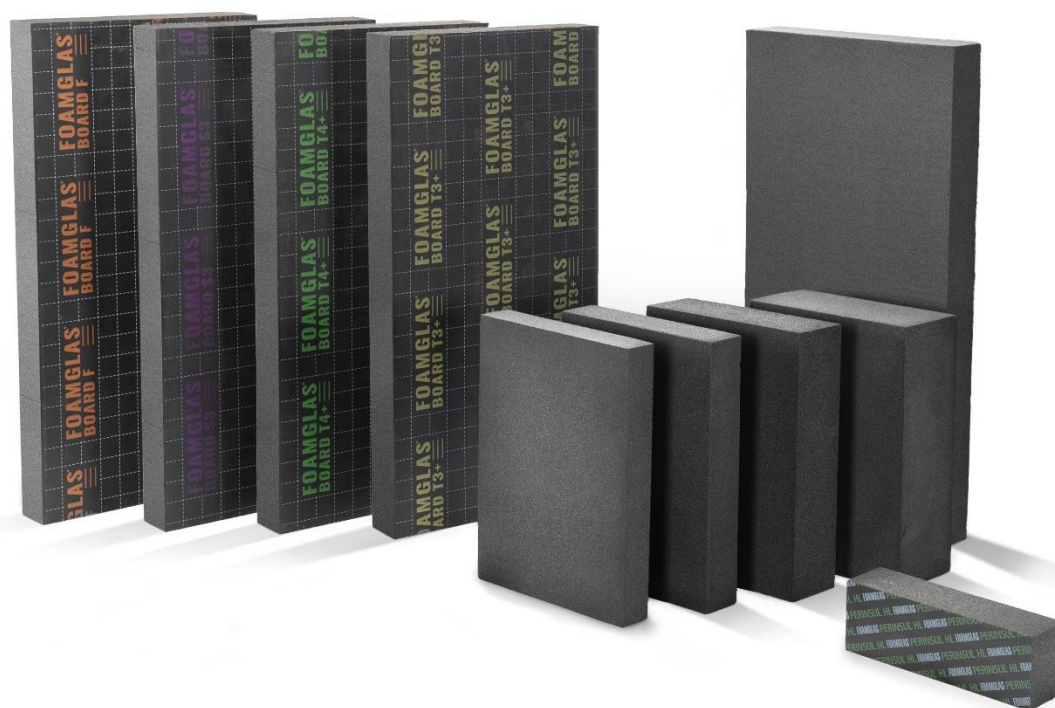




Technical Guidelines 03 (TG03)

# Technical Guidelines

## Below Ground Insulation



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## 1. Introduction

Owens Corning FOAMGLAS® offers different product ranges for below ground applications depending on the requirements, the conditions of the ground or structure and general project specifications. The two main FOAMGLAS® product ranges to be used for below ground applications are FOAMGLAS® slab and FOAMGLAS® board.

Both ranges are made with cellular glass insulation, however the FOAMGLAS® slab range comes unfaced and is a non-combustible, Euroclass A1 rated product. On the other hand, FOAMGLAS® board comes with a pre-applied coating that makes the product E rated.

Further information on the type(s) of FOAMGLAS® cellular glass suitable for a specific below ground application can be found within the relevant Technical Data Sheets (TDS's).

The tables below provide a summary of the main characteristics of each FOAMGLAS® product type, with more detailed information available in the applicable Product Data Sheets (PDS's):

**Table 1 – FOAMGLAS® slabs**

FOAMGLAS® slab	Dimensions (Length x Width x Thickness – mm)	Euroclass Reaction to fire (EN 13501-1)	Compressive Strength* (EN 826 annexe A) kPa	Thermal Conductivity (EN ISO 10456) W/(m·K)
T3+	600 x 450 x 50 to 200 1200 x 600 x 80 to 180	A1	500	0.036
T4+	600 x 450 x 40 to 200	A1	600	0.041
S3	600 x 450 x 40 to 200	A1	900	0.045
F	600 x 450 x 40 to 180	A1	1600	0.050

*\*The compressive strength shown above and within the FOAMGLAS® data sheets is the UDL worst case breakpoint. Please use an appropriate safety factor when determining the working/allowable loads.*



FOAMGLAS® slabs

Table 2 – FOAMGLAS® boards

FOAMGLAS® board	Dimensions (Length x Width x Thickness – mm)	Euroclass Reaction to fire (EN 13501-1)	Compressive Strength* (EN 826 annexe A)	Thermal Conductivity (EN ISO 10456) W/(m·K)
T3+	1200 x 450 x 50 to 200	E	500	0.036
T4+	1200 x 450 x 40 to 200	E	600	0.041
S3	1200 x 450 x 40 to 200	E	900	0.045
F	1200 x 450 x 40 to 180	E	1600	0.050

*\*The Compressive Strength shown above and within the FOAMGLAS® data sheets is the UDL worst case breakpoint. Please use an appropriate Safety Factor when determining the working/allowable loads.*



FOAMGLAS® boards

## FOAMGLAS® PERINSUL HL Thermal Block

FOAMGLAS® PERINSUL HL is a very high-density insulation product specifically designed to eliminate structural thermal bridging.

The upper and lower faces of the insulation block are bitumen coated and covered with a green printed PE/glass fleece composite liner, compatible with masonry mortar. FOAMGLAS® PERINSUL HL must be installed in a single, linear course.

The use of PERINSUL HL is optimal for avoiding thermal breaks between horizontal and vertical insulation applications (e.g., floor/wall junctions). Refer to sections 2.2 & 3.1 for further guidance.

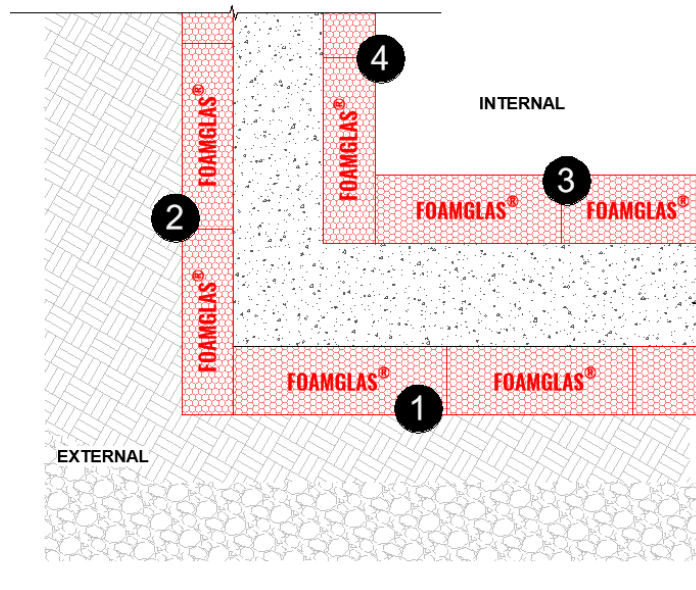


FOAMGLAS® PERINSUL HL



## 1.1 Below Ground Insulation Applications

FOAMGLAS® products can be used in below ground applications to insulate ground floors and basements. FOAMGLAS® insulation is suitable to either insulate from the inside or from the outside of the building as shown in the image below:



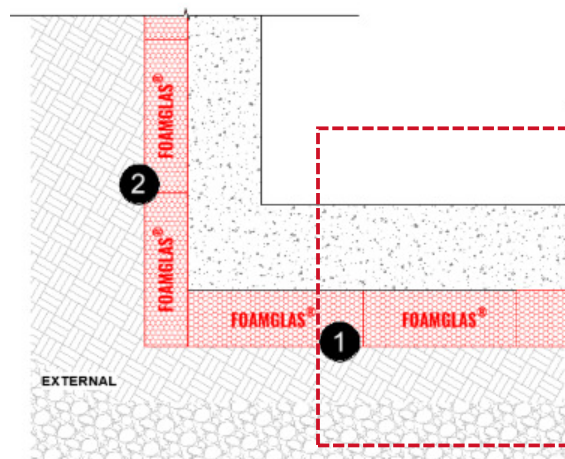
1. Below Ground External Floor Slab Insulation
2. Below Ground External Wall Insulation
3. Below Ground Floor Slab Insulation
4. Below Ground Internal Wall Insulation

Further information relating to the use of FOAMGLAS® cellular glass in each application, installation guidelines and requirements is provided in more detail in the following sections.

## 2. FOAMGLAS® Cellular Glass as External Insulation

One of the options to insulate ground floors of basements is by having the thermal line outside of the building, placing all the insulation to the external side of the structure and/or in contact with the ground.

### 2.1 Below Ground External Floor Slab Insulation



1. Below Ground External Floor Slab Insulation
2. Below Ground External Wall Insulation

## General Installation

FOAMGLAS® boards and slabs should be installed in accordance with the guidance provided in the Technical Data Sheet relevant to the specific application.

## Blinding Requirements & Preparation

FOAMGLAS® boards and slabs should be positioned on a firm and level substrate. Typically, a blinding layer of concrete is recommended, however should sand be used as alternative, it is important that it is well compacted prior to installation of the insulation. Additionally:

- All expansion and movement joints should be continued through the structure.
- The flatness and the general conditions of the blinding are important criteria when using FOAMGLAS® products. The FOAMGLAS® Technical Department can be consulted for further guidance. Under a straight (reference) bar of 2m, the unevenness should be less than 5mm or 3mm under a straight (reference) bar of 0.6m.

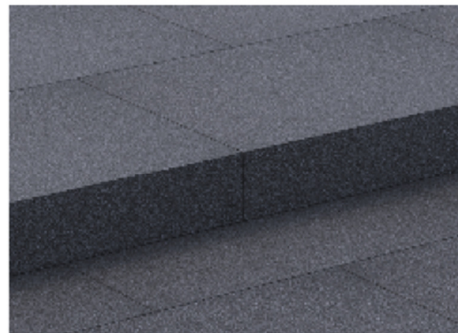
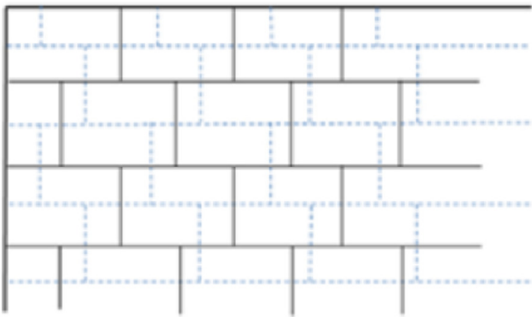
## Single and Double Layer Systems

### Single Layer System:

FOAMGLAS® insulation must be installed with staggered joints. The infill pieces need to have a minimum width of 150mm. All joints between the FOAMGLAS® boards and slabs must be tight, and no gaps exist where they meet service penetrations, edge details and other foundation features, e.g., piles which perforate the insulation layer.

### Double Layer System:

FOAMGLAS® boards and slabs must be with staggered joints in each layer and between the different layers. (See images below.) We recommend a minimum 150mm staggered overlap.



All joints between the FOAMGLAS® boards and slabs in all layers must be installed tightly without gaps where they meet service penetrations, edge details and other foundation features, e.g., piles which perforate the insulation layer. The infill pieces to close gaps need to have a minimum width of 150mm.

**Protection while Installing:**

A protective foot or crawl board/mat must be used to distribute the loads on top of the FOAMGLAS® insulation during the installation of the covering layers.

**Damp/Waterproofing/Ground Gas Membranes:**

The required damp proof/waterproof/ground gas protection membrane can be positioned either above or below the FOAMGLAS® layer, based upon the site-specific requirements and the design provided by the project architect or engineer. Please follow manufacturer's guidance and recommendations for installation.

**Reinforcement Spacers:**

A separation layer i.e. damp proof membrane (DPM) / waterproofing membrane (by others) should be placed over the FOAMGLAS® BOARDS and slabs prior to installation of the reinforcement spacers, in accordance with the relevant national standards and the project specific requirements.

On top of this separation layer a layer of concrete blinding can be spread to distribute the spacer loads if a heavy reinforcement layout has been specified.

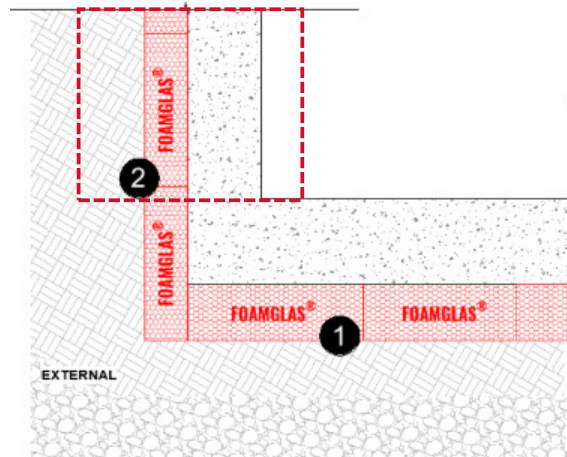
**Concrete Pour:**

The placement of concrete should take place by pouring, with only foot traffic (no plant) permissible on the FOAMGLAS® installation and with dimensioning according to the instructions of the architect/engineer. Care should be taken not to damage the FOAMGLAS® product during this process, including subsequent operations such vibration, compaction and finishing.

**Applicable Technical Data Sheets:**

- **TDS 1.1.1:** FOAMGLAS® board (Euroclass E) loosely laid on levelling compound.
- **TDS 1.1.10:** FOAMGLAS® slab (Euroclass A1) loosely laid on levelling compound.
- **TDS 1.1.11:** FOAMGLAS® slab (Euroclass A1) fully bonded with cold adhesive.

## 2.2 Below Ground External Wall Insulation



1. Below Ground External Floor Slab Insulation
2. Below Ground External Wall Insulation

### General Installation

FOAMGLAS® boards and slabs should be installed in accordance with the guidance provided in the Technical Data Sheet relevant to the specific application. Where the Technical Data Sheet indicates an adhesive is required, this should be used as shown (full coverage or 'dot and dab' method) and applied to a suitably primed substrate.

### Substrate Requirements and Preparation

FOAMGLAS® boards and slabs should be positioned on a clean, flat and smooth substrate that provides full and continuous support. Imperfections in the substrate that do not meet these criteria should be addressed prior to installation. Additionally:

- FOAMGLAS® application should preferably take place when the ambient air temperature and temperature of the substrate are above 5° C.
- All expansion and movement joints should be continued through the structure.
- The flatness and the general conditions of the substrate are important criteria when using FOAMGLAS® cellular glass. The FOAMGLAS® Technical Department can be consulted for further guidance. Under a straight (reference) bar of 2m, the unevenness should be less than 5 mm or 3 mm under a straight (reference) bar of 0.6m.

### Single and Double Layer Systems

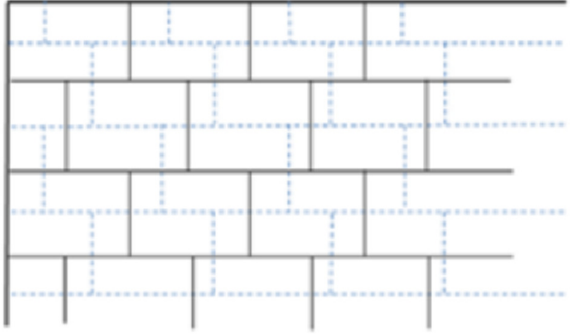
#### Single Layer System:

FOAMGLAS® insulation must be installed with staggered joints. The infill pieces need to have a minimum width of 150mm. All joints between the FOAMGLAS® boards and slabs must be tight and no gaps exist where they meet service penetrations, edge details and other foundation features.



**Double Layer System:**

FOAMGLAS® boards and slabs must be with staggered joints in each layer and between the different layers. (See images below.) We recommend a minimum 150mm staggered overlap.



All joints between the FOAMGLAS® boards and slabs in all layers must be installed tightly without gaps where they meet service penetrations, edge details and other foundation features. The infill pieces to close gaps need to have a minimum width of 150mm.

**Damp/Waterproofing/Ground Gas Protection:**

The required damp proof/waterproof/ground gas protection membrane can be positioned either inside (against the retaining walls) or outside of the FOAMGLAS® layer, based upon the site-specific requirements and the design provided by the project architect or engineer.

**Protection and Backfilling:**

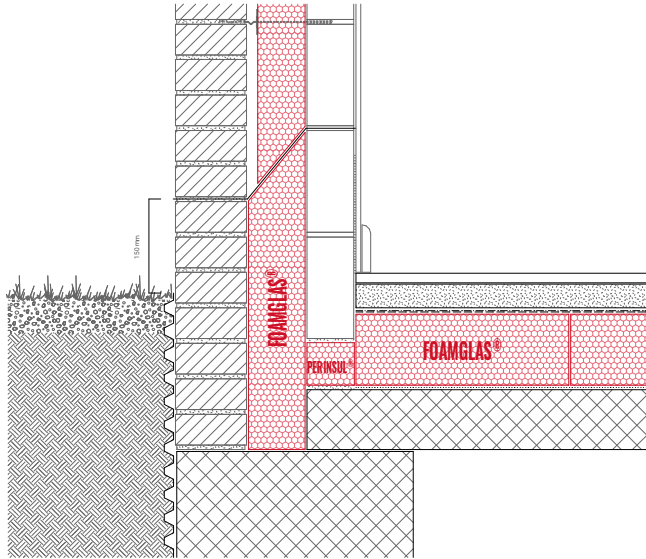
Prior to placing backfill against the FOAMGLAS® insulation layer, a protection board/combined protection and drainage product (by others) should be positioned against the insulation to adequately protect it from potential damage.

**Applicable Technical Data Sheets:**

- TDS 1.2.1: FOAMGLAS® slab (Euroclass A1) fully bonded with cold adhesive PC®56.
- TDS 1.2.6 FOAMGLAS® board (Euroclass E) fully bonded with cold adhesive PC®56.

## Junctions

- Typical detail for base of the façade / below DPC detail including FOAMGLAS® Perinsul:

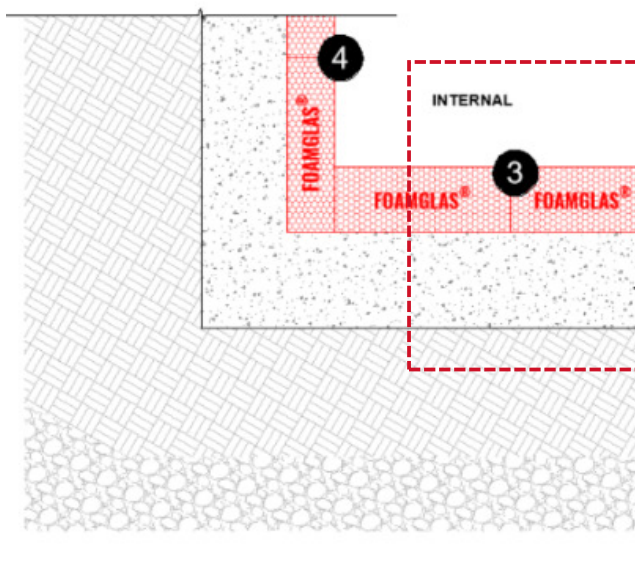


*FOAMGLAS® Perinsul blockwork internal*

## 3. FOAMGLAS® Cellular Glass as Internal Insulation

An alternative is to insulate ground floors of below ground structures by having the thermal line inside of the building, so the insulation is placed to the internal side of the structure/substrate.

### 3.1 Below Ground Internal Floor Slab Insulation



- 3. Below Ground Internal Floor Slab Insulation
- 4. Below Ground Internal Wall Insulation

## General Installation

FOAMGLAS® boards and slabs should be installed in accordance with the guidance provided in the Technical Data Sheet relevant to the specific application. Where the Technical Data Sheet indicates an adhesive is required, this should be used as shown and applied to a suitably primed substrate.

## Substrate Requirements and Preparation

FOAMGLAS® boards and slabs should be positioned on a clean, flat and smooth substrate that provides full and continuous support. Imperfections in the substrate that do not meet these criteria should be addressed prior to installation. Additionally:

- FOAMGLAS® application should preferably take place when the ambient air temperature and temperature of the substrate are above 5° C.
- All expansion and movement joints should be continued through the structure.
- The flatness and the general conditions of the substrate are important criteria when using FOAMGLAS® insulation. The FOAMGLAS® Technical Department can be consulted for further guidance. Under a straight (reference) bar of 2m, the unevenness should be less than 5mm or 3mm under a straight (reference) bar of 0.6m.

## Single and Double Layer Systems

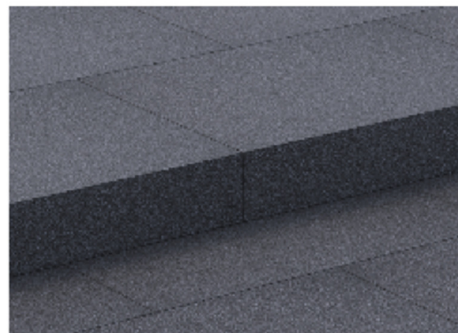
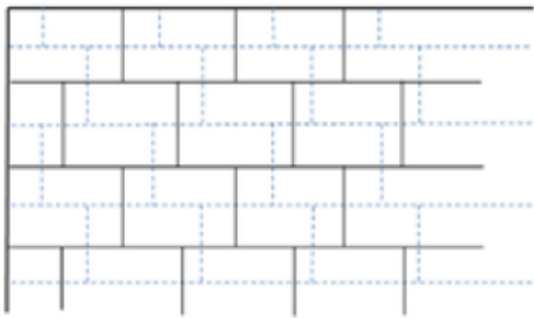
### Single Layer System:

FOAMGLAS® insulation must be installed with staggered joints. The infill pieces need to have a minimum width of 150mm.

All joints between the FOAMGLAS® boards and slabs must be tight and no gaps exist where they meet service penetrations, edge details and other foundation features.

### Double Layer System:

FOAMGLAS® boards and slabs must be with staggered joints in each layer and between the different layers. (See images below.) We recommend a minimum 150mm staggered overlap.



All joints between the FOAMGLAS® boards and slabs in all layers must be installed tight and no gaps exist where they meet service penetrations, edge details and other foundation features. The infill pieces to close gaps need to have a minimum width of 150mm.

**Damp/Waterproofing (incl. Cavity Drain Systems)/Ground Gas Protection:**

The required damp proof/waterproof/ground gas protection membrane can be positioned either above or below the FOAMGLAS® layer, based upon the site-specific requirements and the design provided by the project architect or engineer.

Further guidance relating to the specific use of a Cavity Drain Membrane in conjunction with FOAMGLAS® insulation can be sought by contacting the FOAMGLAS® Technical Department.

**Screed Installation (incl. Underfloor Heating):**

The placement of screed should take place by pouring or manual placement, with only foot traffic (no plant) permissible on the FOAMGLAS® installation and dimensioning according to the instructions of the architect/engineer. Care should be taken not to damage the FOAMGLAS® product during this process, including subsequent operations such vibration, compaction and finishing.

A separation layer should be placed over the FOAMGLAS® layer prior to installation of the screed. Should an Under Floor Heating (UFH) system be specified, self-adhesive fixing clips should be applied to the VCL prior to installation of the covering screed.

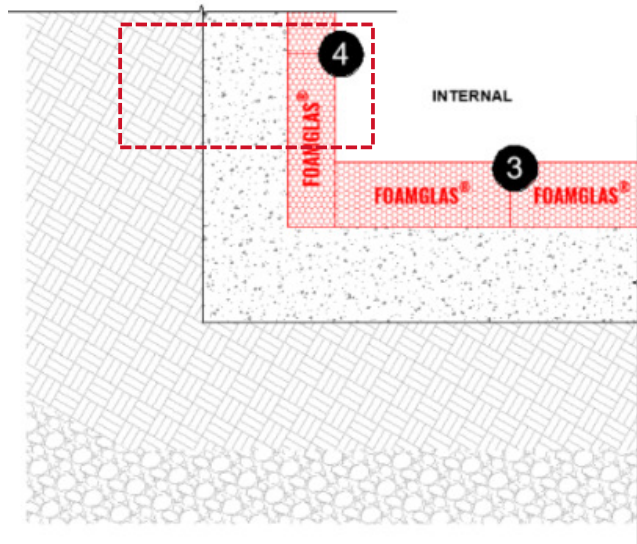
**Protection layers:**

A protective foot or crawl board/mat must be used to distribute the loads on top of the FOAMGLAS® insulation during the installation of the covering layers.

**Applicable Technical Data Sheets:**

- TDS 3.1.2: FOAMGLAS® slab (Euroclass A1) fully bonded with cold adhesive PC® 58.
- TDS 3.1.3: FOAMGLAS® board (Euroclass E) loosely laid.
- TDS 3.1.15: FOAMGLAS® slab (Euroclass A1) loosely laid.
- TDS 3.1.16: FOAMGLAS® slab (Euroclass A1) fully bonded with cold adhesive PC® 74 A1 (Euroclass A1).
- TDS 3.4.1 & 3.4.2: FOAMGLAS® slab (Euroclass A1) fully bonded with cold adhesive PC® 58 and a cavity drain membrane.

### 3.2 Below Ground Internal Wall Insulation



3. Below Ground Internal Floor Slab Insulation  
4. Below Ground Internal Wall Insulation

#### General Installation – FOAMGLAS® Insulation

FOAMGLAS® boards and slabs should be installed in accordance with the guidance provided in the Technical Data Sheet relevant to the specific application. Where the Technical Data Sheet indicates an adhesive is required, this should be used as shown and applied to a suitably primed substrate.

#### Substrate Requirements & Preparation

FOAMGLAS® boards and slabs should be positioned on a clean, flat and smooth substrate that provides full and continuous support. Imperfections in the substrate that do not meet these criteria should be addressed prior to installation. Additionally:

- FOAMGLAS® application should preferably take place when the ambient air temperature and temperature of the substrate are above 5° C.
- All expansion and movement joints should be continued through the structure.
- The flatness and the general conditions of the substrate are important criteria when using FOAMGLAS® insulation. The FOAMGLAS® Technical Department can be consulted for further guidance. Under a straight (reference) bar of 2 m, the unevenness should be less than 5mm or 3mm under a straight (reference) bar of 0.6m.

#### Single and Double Layer Systems

##### Single layer system:

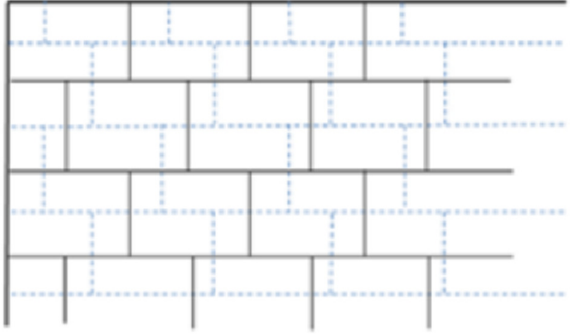
FOAMGLAS® insulation must be installed with staggered joints. The infill pieces need to have a minimum width of 150mm.

All joints between the FOAMGLAS® boards and slabs must be tight and no gaps exist where they meet service penetrations, edge details and other foundation features, e.g., piles which perforate the insulation layer.



### Double Layer System:

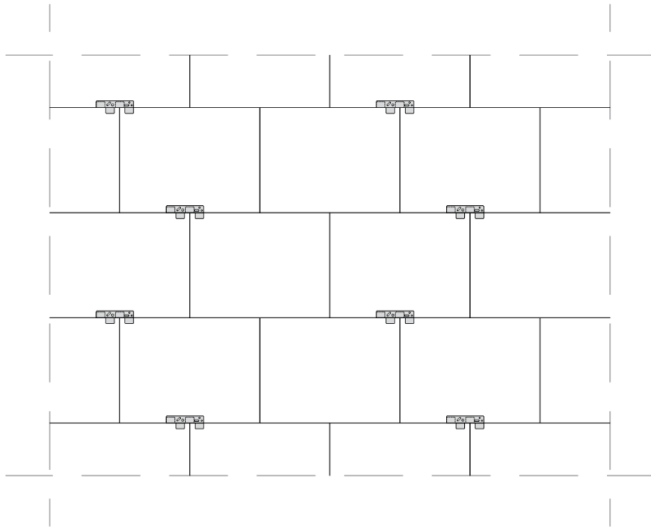
FOAMGLAS® boards and slabs must be with staggered joints in each layer and between the different layers. (See images below.) We recommend a minimum 150mm staggered overlap.



All joints between the FOAMGLAS® boards and slabs in all layers must be installed tight and no gaps exist where they meet service penetrations, edge details and other foundation features. The infill pieces to close gaps need to have a minimum width of 150mm.

### Mechanical Fixings PC® F Anchors

The use of PC® F anchors is a requirement in addition to adhesive, to provide long-term structural support to FOAMGLAS® installation against internal wall surfaces. These should be applied with a consumption of 2 anchors per m<sup>2</sup> of insulation following the suggested layout indicated below:



Further information is provided within the PC® F-anchor Product Data Sheet.

### Damp/Waterproofing (incl. Cavity Drain Systems):

The required damp proof/waterproof/ground gas protection membrane can be positioned either behind or in front of the FOAMGLAS® layer, based upon the site-specific requirements and the design provided by the project architect or engineer.

Further guidance relating to the specific use of a Cavity Drain Membrane in conjunction with FOAMGLAS® insulation can be sought by contacting the FOAMGLAS® Technical Department.

### Protection Layers:

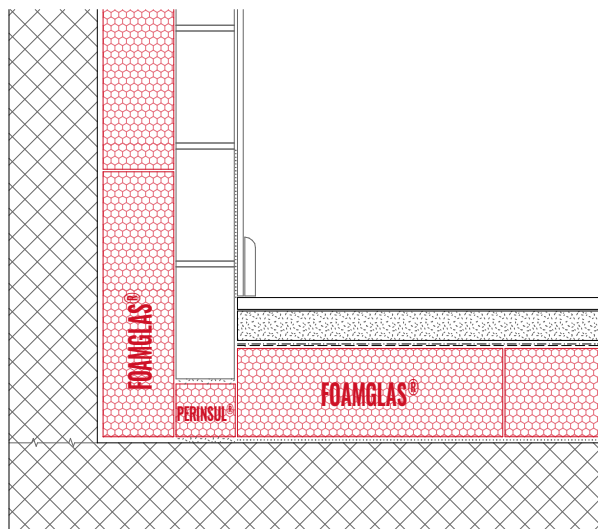
Care should be taken not to damage FOAMGLAS® insulation during installation or the process of applying finishes or coatings. Any damaged slabs or boards should be removed and replaced prior to covering.

### Applicable Technical Data Sheets

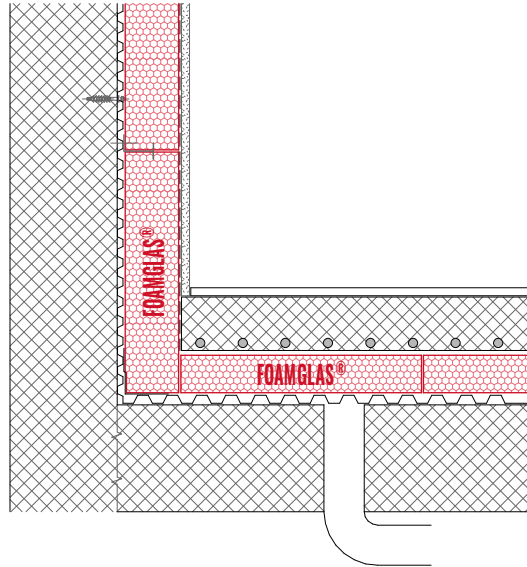
- TDS 3.2.7: : FOAMGLAS® slab (Euroclass A1) fully bonded with cold adhesive PC®56 and plasterboard finish.
- TDS 3.2.9: FOAMGLAS® slab (Euroclass A1) fully bonded with cold adhesive PC®56 and facing wall.
- TDS 3.2.17: FOAMGLAS® slab (Euroclass A1) fully bonded with cold adhesive PC®74 A1 (Euroclass A1) and render finish.
- TDS 3.9.7: FOAMGLAS® slab (Euroclass A1) fully bonded with PC®56 and a cavity drain membrane (wall application)

### Junctions

- Typical detail between internal below ground floor/wall insulation with FOAMGLAS® PERINSUL HL thermal block.



- Typical detail for internal below ground floor/wall insulation with a cavity drainage.



#### 4. Other Below Ground Applications

Guidance for other below ground insulation applications, including roofs and soffits for basements structures, is available upon request. Please contact the FOAMGLAS® Technical Department for assistance.

#### 5. Materials Handling and Safety

##### Safety Measurement and PPE:

- Wear the PPE required for the construction site. The wearing of PPE is required to meet site specific regulations. Gloves and normal protective work clothing with long sleeved shirt and safety glasses while handling. Safety glasses are a must. When cutting, grinding, crushing or drilling FOAMGLAS® insulation, wear safety glasses with side shields or dust goggles in dusty environments. Wear goggles for dust protection while cutting or abrading in wind.
- The use of a face mask is recommended when handling and installing FOAMGLAS® cellular glass insulation.
- Follow the safety as indicated in our Safety Data Sheets (SDS).
- Always follow the safety instructions valid for the construction site.

## 6. Handling and Cutting

FOAMGLAS® products can be easily cut on site, with the following guidance:

- Grinding can be used to make minimal adjustments.
- Cutting can be used to cut adjustment pieces to make fitting pieces (of minimum 150mm) and/or to create the staggered joint installation required.

**Attention:** A wood cutting saw is not recommended for cutting FOAMGLAS® products on site as it will wear quickly. For minimal quantities of fabrication (cutting) of the insulation on site, a metal cutting saw with a hardened steel blade is recommended.

Make sure to guide the saw in the correct way to ensure a straight cut. The insulation can generally be cut on site, as follows:

- Two packs of FOAMGLAS® insulation are placed at the same height, at a few centimetres from each other.
- Measure the slab or board and mark the cutting line (Image 1).
- Lay the FOAMGLAS® slabs or boards in such a way that the cutting line is in the middle of the opening between the two supporting packs.
- A packing carton can be used as a square.



Image 1

- A metal/wood guide profile is placed on the packing carton. When cutting, the saw can follow the guide profile to cut the insulation to size (Image 2).
- The FOAMGLAS® slabs or boards may be cut on site with regular hand tools as described above; a metal saw can be used for cutting the insulation slabs. However, a sawing machine is strongly recommended for maintaining uniform insulation slab edges and consequently the joints if the quantity of insulation to be adapted is significant.

Saw straight both lengthways and downwards.

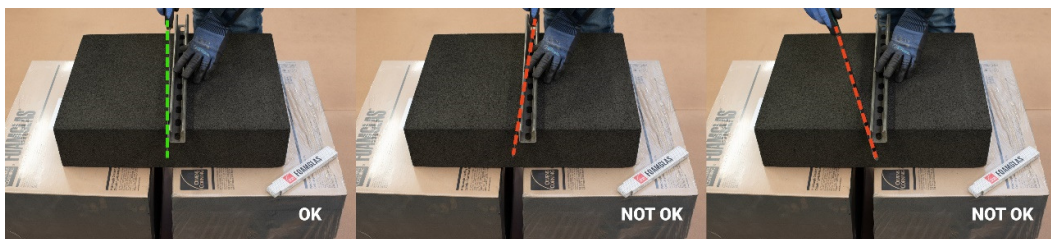
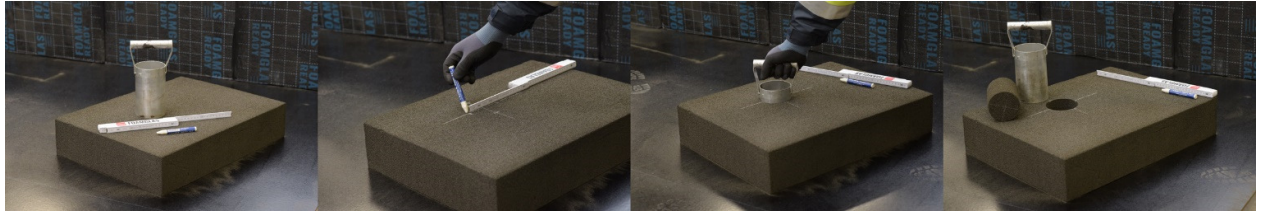


Image 2

- It is recommended to undertake the cutting and abrading in one working area to avoid FOAMGLAS® “dust” over the already installed FOAMGLAS® product.

### Pipe Penetrations in FOAMGLAS® Material:

To cut round holes, e.g., pipe or duct penetrations, take a tube with the appropriate diameter and press it slightly through the FOAMGLAS® material.



## 7. Contact Details

OWENS CORNING INSULATION (UK) LTD.

Technical Support (for projects and technical advice): [technical@foamglas.co.uk](mailto:technical@foamglas.co.uk)

Customer Care Team (for pricing and product availability): [info@foamglas.co.uk](mailto:info@foamglas.co.uk)

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