

Thermal insulation in a humid environment

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Building



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Table of contents

Very high humidity	4
Condensation	5
Dew point (Mollier diagram)	5
Where condensation occurs	6
The causes and consequences	6
FOAMGLAS® insulation	7
Properties of FOAMGLAS®	8
Ecology and Health	8
FOAMGLAS®: the solution in a humid environment	9
Acoustics	10
Installation of FOAMGLAS® solutions	11
Advantages of FOAMGLAS® in a high and very high humidity environment	12
Cross sections (drawings)	29



1

Very high humidity

Swimming pools, collective changing rooms/showers, kitchens, laundries and some industrial plants (paper mills, tanneries, dairies, ...) have high humidity areas in which the Building fabric's subject to significant hygrothermal stresses.

The risk of condensate forming in the walls and roofs of these premises is therefore significant with well-known consequences such as:

- Moisture in the insulation causing a drop in thermal performance;
- Decay of the organic components;
- Corrosion of the metal components;
- Peeling or blistering of some coatings;
- Premature ageing of the building fabric;
- Spalling concrete on the surface of the ceiling.

Faced with these specific problems on these projects, the first part of this document presents the constraints related to very high humidity and the second part the FOAMGLAS® solutions according to the different details in the building.

- 1 Ice palace, St. Petersburg, Russia
- 2 Hotel Newquay, United Kingdom
- 3 Moulins swimming pool – Architectes MBA
- 4 Wastewater treatment plant, St Michel de Maurienne – J. Termignon architect



2



3



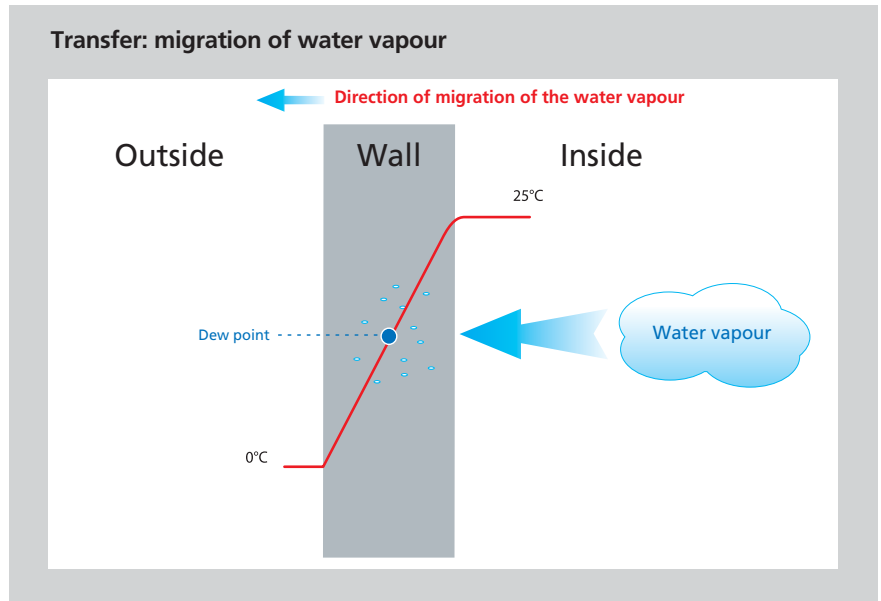
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Condensation

Locations classified as having high and very high humidity are characterised by a relatively high water vapour production and are therefore more exposed to the phenomenon of condensation.

Definition

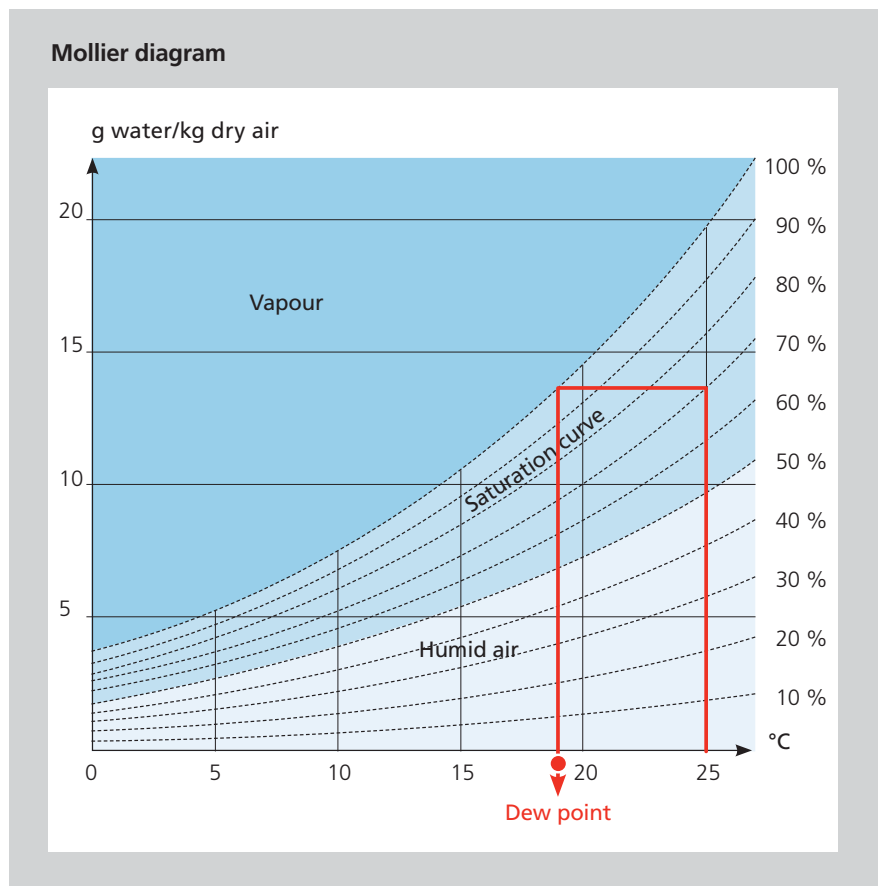
Condensation occurs when water changes from the vapour phase to the liquid phase, thus it concerns the dew point. This can be determined by the Mollier diagram.



Dew point (Mollier diagram)

The Mollier diagram shows the different states of the vapour enabling the dew point to be determined.

The Mollier diagram clearly illustrates the transitions of water between the gas and liquid phases according to the temperature. It shows 3 sets of data: the temperature (x-axis), the amount of moisture (absolute humidity in g/kg dry air, approximately equal to g/m^3 air, the ordinate on the left of the diagram), and the relative humidity (in % on the right of the diagram).

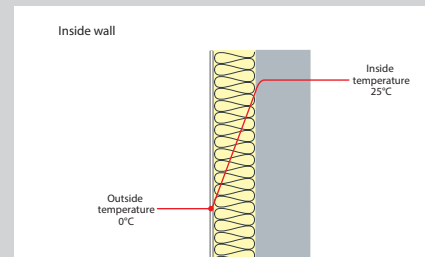
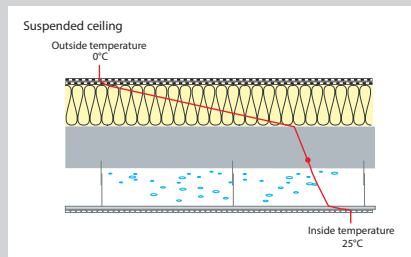
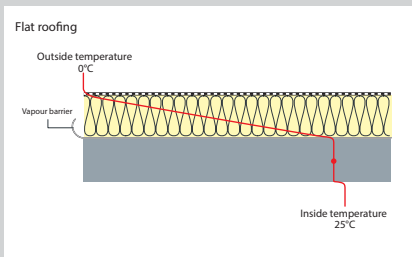


Example

For a building with an inside temperature $T_i = 25^\circ\text{C}$ and an inside relative humidity R.H. = 70%, the humidity of the air is 14 g per kg of dry air. For such an air humidity, the dew point temperature is 19°C (see the saturation curve).

Where condensation occurs

Condensation may occur at various locations within a building:



When it is cold outside of a very high humidity building, for example 0°, and it is 25° on the interior, **the temperature does not suddenly change from 25°C to 0°C.**

From the inside to the outside, there is a varying drop in temperature in each component of the building fabric according to its constitution (type of materials and thicknesses).

The segments of this temperature drop curve are proportional to the thermal resistance of each component.

Moreover, the dew points often appear below the vapour barrier due to loss of insulation performance or failure of the vapour barrier.

The causes

These phenomena may be caused by:

- **The non-continuity of the vapour barrier (joint, special points, mechanical fastening...);**
- **Poor dimensioning of the insulation controlling the position of the dew point under the vapour barrier;**
- **Changing the positioning of the dew point during operation due to water ingress into the insulation (infiltration of the seals, vapour passage) and compaction of the insulation;**
- **Reliability of the vapour barrier adhesives during installation;**
- **Presence of penetrating mechanical fastenings (thermal bridge);**
- **Presence of an insulation sensitive to moisture and vapour;**
- **Degradation of the thermal performance.**

The consequences

Faced with all these identified elements, the consequences can be serious for the operation of the construction:

- **Risk of corrosion of metal components;**
- **Appearance of damp and mould;**
- **Deterioration of interior finishes (blistering, peeling earthenware...);**
- **Increased energy consumption.**



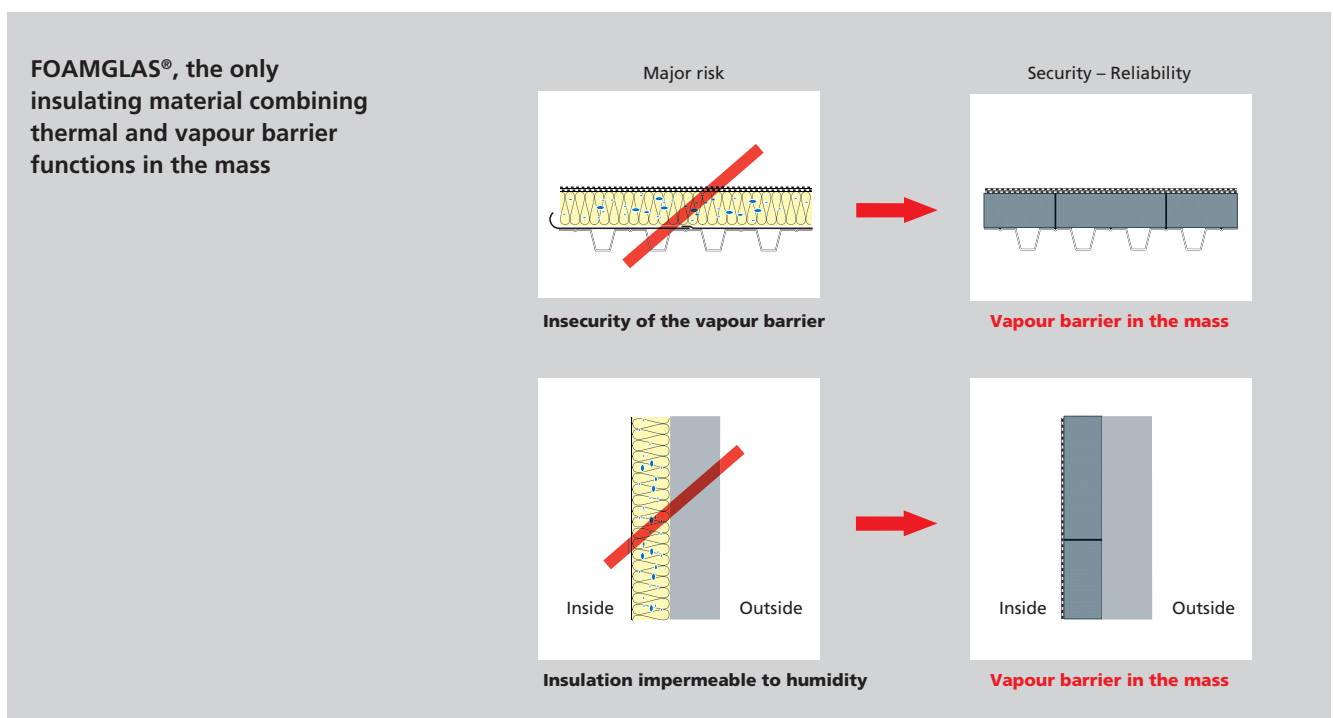


1 Aquatic centre Fougères,
France - Octant architecture

FOAMGLAS® insulation

To prevent condensation in the building fabric, it is imperative to provide a vapour barrier that is efficient and reliable over time.

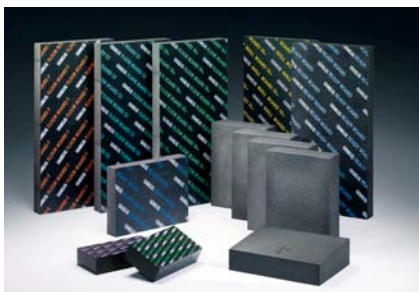
Whatever the hygrothermal conditions, it should not be possible for the vapour to diffuse into the building fabric and be exposed to the dew point temperature at which it condenses. Perfectly impermeable to water and water vapour, FOAMGLAS® insulation is a continuous vapour barrier that does not require the use of an additional vapour barrier if installed in a compact system.



Features and Benefits

FOAMGLAS® cellular glass insulation is a 100% glass product made from recycled vehicle windscreens. It is totally inorganic and has no binding agent. It is composed of millions of hermetically sealed cells, which gives it a certain number of benefits:

- **Permanence of its physical and thermal performance over time**
- **Non- biodegradable**
- **Perfectly impermeable to water and vapour**
- **Inert as regards environmental impact**
- **Non-flammable (A1)**



Ecology and Health

Made from recycled glass, made to last the lifetime of the building and recyclable at end of life, FOAMGLAS® is perfectly in line with sustainable development and has many labels and certificates attesting to an outstanding ecological footprint:



Institut Bauen und Umwelt e.V.



With respect to health and the hygiene of the indoor air, FOAMGLAS® insulation does not emit any harmful substances and prevents mould formation.

These qualities are particularly important for maintaining a healthy atmosphere inside buildings.

FOAMGLAS® is classified A+ as regards emissions harmful to health in interior air – materials labelling according to the Decree of 19 April 2011



The properties of FOAMGLAS® adapt to a humid environment

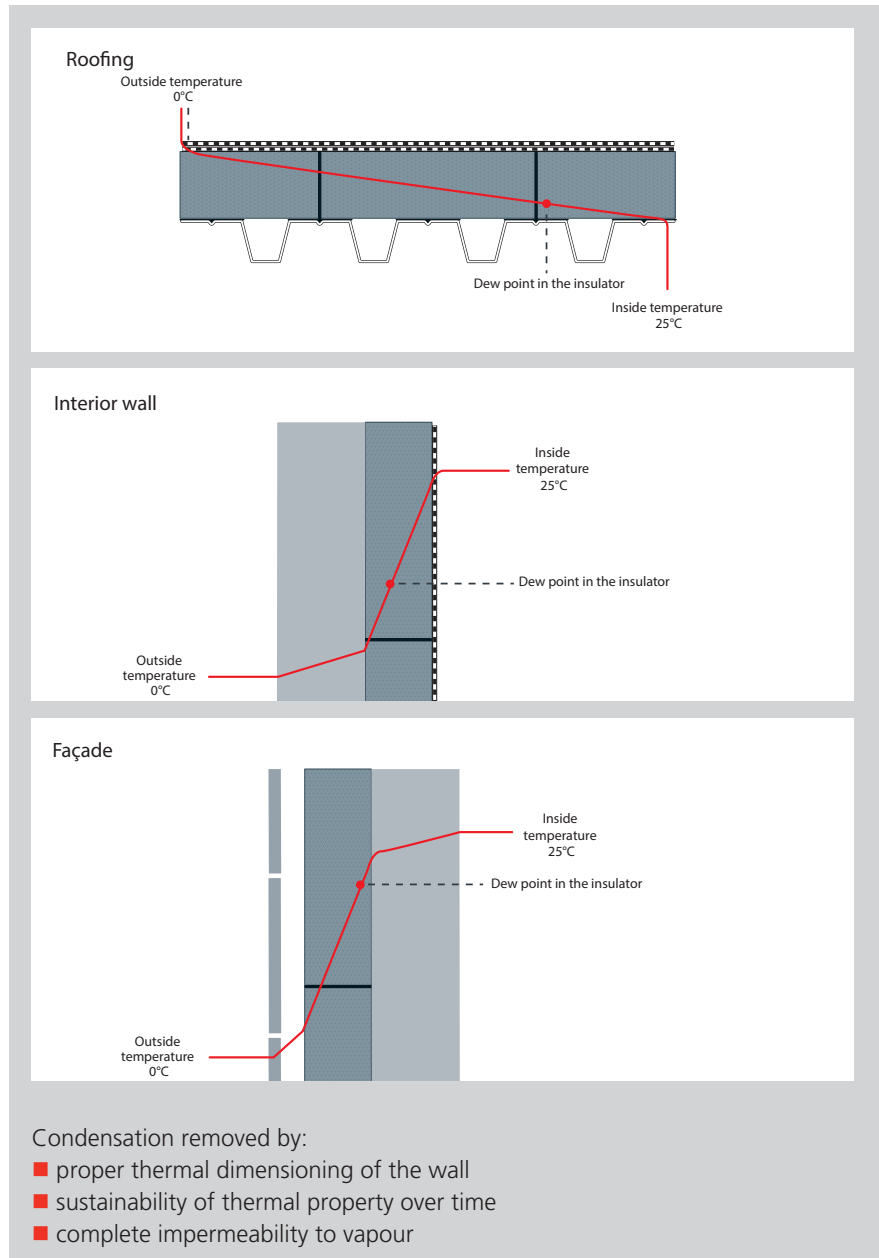


- 1 Impermeable to water** FOAMGLAS®, composed of hermetically sealed glass bubbles, is impermeable to water. **Advantage:** with FOAMGLAS® slabs & boards bonded together, water cannot circulate in the insulation layer, and rising damp by capillary action is impossible. Interior finishes are protected.
- 2 Resistant to rodents** FOAMGLAS® is a 100% glass product. **Advantage:** no deterioration of the insulation due to insects and rodents.
- 3 Resistant to compression** FOAMGLAS® presents a high resistance to compression, without compaction or creep. **Advantage:** FOAMGLAS® can be subjected to compression with great reliability, resulting in particular in excellent performance of flooring (tiles, paint finishes, etc.).
- 4 Non-flammable** FOAMGLAS® is incombustible. Optimum fire classification: A1 (Euroclass). **Advantage:** recommended especially for the interior insulation of establishments open to the public (schools, gyms, shops, museums, monuments, ...).
- 5 Impermeable to vapour** FOAMGLAS® is impermeable to air and humidity. **Advantage:** prevents condensation and mould growth; protects finishes from certain damage (peeling, blistering, ...).
- 6 Non-deformable** FOAMGLAS® is dimensionally stable. The cellular glass has a very low coefficient of expansion. **Advantage:** no bending, swelling or shrinking, the plates can be fully bonded to the support and to one another.
- 7 Resistant to acids** FOAMGLAS® is resistant to organic solvents and acids. **Advantage:** aggressive agents and corrosive atmospheres do not deteriorate the insulation.
- 8 Easy to work** FOAMGLAS®, composed of very thin glass foams, it can be shaped easily. **Advantage:** various electrical outlets and pipes can be inserted.
- 9 Ecological** Stable product manufactured using recycled glass and recyclable at end of life. Excellent ecological footprint.

FOAMGLAS®:
the solution in a humid environment

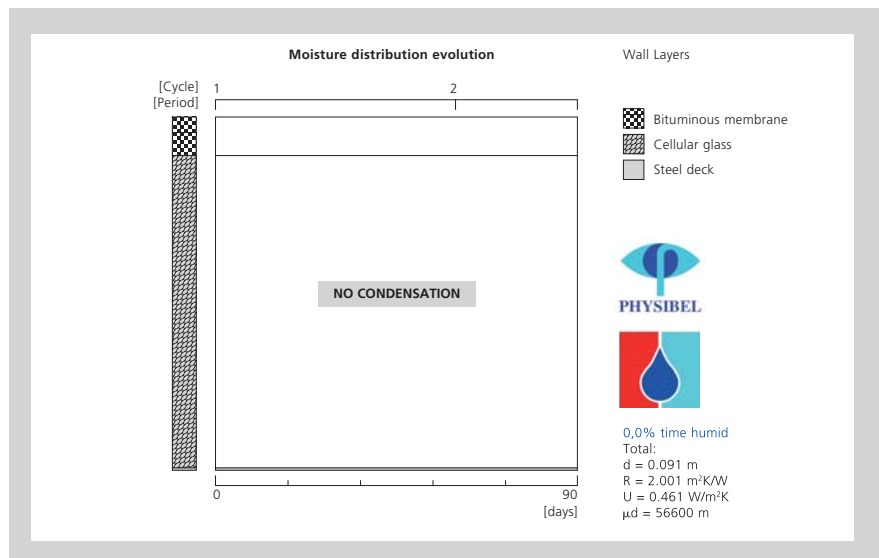
No condensation

Unlike other insulation, the complete impermeability to vapour of FOAMGLAS® removes any risk of condensation in the insulation, it prevents vapour diffusing and reaching the dew point inside it. Furthermore, FOAMGLAS® is the only insulation to have a thermal guarantee over time.



Hygrothermal studies
(by our technical service)

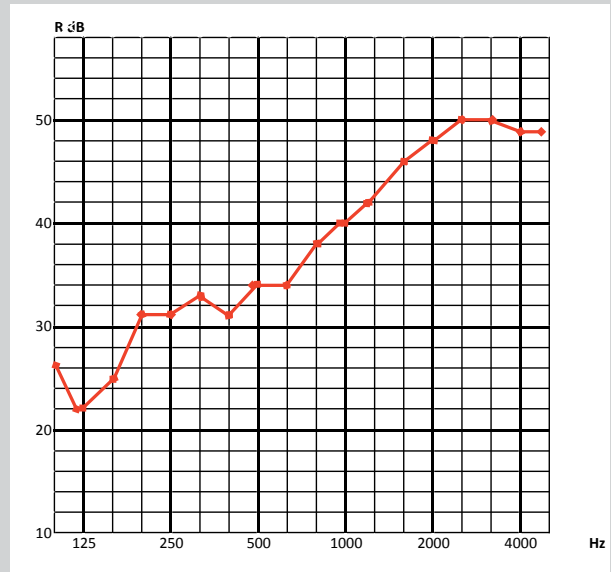
To avoid all condensation in the insulation, PITTSBURGH CORNING offers to carry out your hygrothermal study (Glasta software) using the parameters specific to your construction (inside and outside temperature, interior relative humidity level, ...) and the composition of the wall.



Acoustics

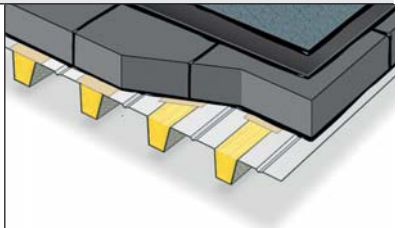
The FOAMGLAS® systems integrate economic and aesthetic acoustic treatment solutions. The system can meet the requirements in terms of attenuation and sound absorption of areas and the realization of interior finishes without false ceilings.

Acoustic attenuation curve (Hz/dB)



Roofing

Insulation system	Acoustic attenuation index Rw (dB)
Steel deck + FOAMGLAS® T4+ thickness 60 mm + membrane	39 dB
Steel deck + FOAMGLAS® T4+ thickness 80 mm + membrane + FOAMGLAS® T4+ thickness 40 mm + 2 membranes	42 dB
Steel deck + FOAMGLAS® thickness 60 mm + FOAMGLAS® T4+ thickness 80 mm + 3 membranes	44 dB
Steel deck + FOAMGLAS® thickness 60 mm + FOAMGLAS® thickness 80 mm + 3 membranes + 5 cm gravel	48 dB
Steel deck + 2 layers of cement board + membrane + FOAMGLAS® + membrane + steel deck + 2 layers of cement board + mineral wool + PVC	54 dB
Steel deck + 2 layers of cement board + FOAMGLAS® + membrane + spacer + steel deck + 2 layers of cement board + FOAMGLAS® + 2 membranes	62 dB
Concrete slab + FOAMGLAS® T4+ thickness 100 mm + protected bilayer membrane	45 dB

Absorption	Coefficient α_w (Alpha Sabine average)
153 mm acoustic steel deck (perforated) with the troughs filled with absorbent acoustic insulation + FOAMGLAS® T4+ thickness 60 mm. 2 bituminous waterproofing membrane	0,6 

Concrete wall

Insulation system	Minimum acoustic attenuation index Rw (dB)
Concrete wall + FOAMGLAS® T4+ thickness 100 mm + 5 mm of tile finishing	45 dB

These test results are not exhaustive. Pittsburgh Corning can offer you other tests or assist you with the services of specialists during your projects.

Installation of FOAMGLAS® solutions

Flat roofing

FOAMGLAS® insulations can be used on all impermeable foundations (concrete, wood, steel) complying with local legislation. Installation can use hot bitumen or cold adhesive with full bonding to the substrate, joints are also closed in the same way.



Façade

FOAMGLAS® insulation can be used vertically across masonry, metal or wood panel foundations. Installation is done using cold bitumen adhesive with complete bonding to the support, joints are closed in the same way. For double-skin cladding, the FOAMGLAS® panels are mechanically fastened at the edges of the slabs and boards and bonded together with a sealed joint.



Interior

FOAMGLAS® insulation can be used in internal lining in walls, ceilings and floors, with any type of finish (false ceiling, tiles, coated, cladding, acoustic). Installation is done using cold bitumen adhesive with complete bonding to the support, joints are treated the same way. An anchoring bracket will be added in a ceiling, attached to the bracket and inserted into the panel joint, this ensures proper securing of the slabs and boards without a thermal bridge.



Limitation of thermal bridges: FOAMGLAS® metal plates

FOAMGLAS® has developed building systems to minimise thermal bridges by means of a metal plate for supporting any finishing element in the roof, façade or ceiling.

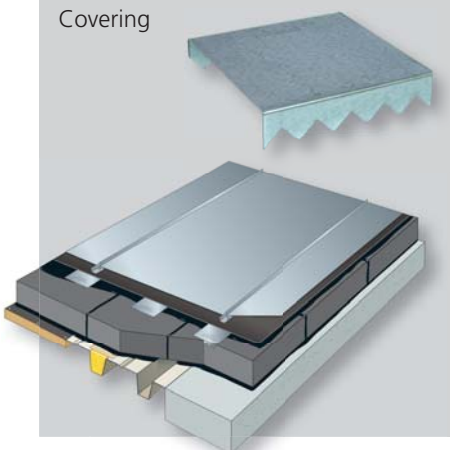
The physical properties of cellular glass and in particular its resistance to com-

pression make it possible to use this type of mounting.

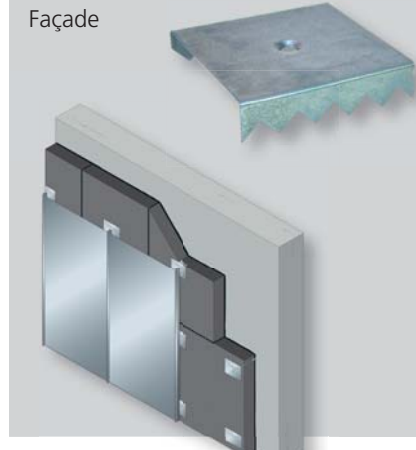
In addition, it allows the use of impermeable membranes on any slope > 20% without puncturing the support by fixing these membranes at the head on these metal plates.



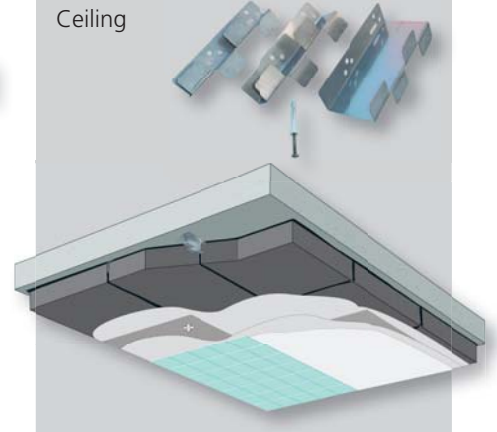
Covering



Façade



Ceiling





The advantages of FOAMGLAS® in a humid environment

Present on the very high humidity area market and especially for swimming pools for more than 40 years, FOAMGLAS® has become the reference for insulating the walls of these constructions.

Prescribed on millions of m² by market specialists, FOAMGLAS® insulation has become the indispensable material for the quality and durability of these walls, which are subjected to very aggressive hygrothermal environments.

FOAMGLAS® integrates and adapts to all architectural forms as well as all the walls of the building (flat roofing, covering, façade and interior).

Any migration of moisture or vapour into the insulation is impossible because of the inherent characteristics of the material: cellular glass is the only insulation completely impermeable to water and water vapour.

- 1 Sauna at a Vacation Home on «Easter Island», Kaltene, Latvia – Architects Zaiga Gaile, Agnese Sirmā
- 2 Mondi SCP Paper Mill, Ružomberok, Slovakia – Architect Ing. Ujmiak, LIMBUS s.r.o.
- 3 Swimming pool «Kráví hora», Brno, CZ – Architect Atelier DRNH, Brno
- 4 Aquapark, Brno – Kohoutovice – CZ – Architect Atelier K4, Brno
- 5 Pumping Station Bruska, Prague, CZ – Architect Sweco, Prague



Main advantages in a high and very high humidity environment

Impermeability to water and air

The only insulation to have total insensitivity to humidity, it ensures the perfect impermeability of your construction.

Vapour barrier

A bulk vapour barrier, without the presence of a perforated vapour barrier or failed vapour barrier adhesive, FOAMGLAS® avoids the phenomenon of vapour diffusion and condensation within it.

Thermal

The absence of humidity and the migration of water vapour in the wall enables FOAMGLAS® to retain its original thermal resistance over time.

No mechanical fixing

Hot adhesive and fully bonded, it avoids any thermal bridges and the risk of corrosion due to the presence of its mountings.

Thermo-acoustic solution

System validated in a humid environment dealing with humidity, acoustics and aesthetics.

Validation

The only insulation to be validated for all substrates (concrete, steel, wood) in a humid environment for any type of building envelope and any application.

Anti-condensation guarantee

The insulation can be dimensioned to remove any risk of condensation in the insulation (depending on parameters passed by you) and the guarantee for the metal supports in relation to the risks of corrosion on the part of the manufacturers.

FOAMGLAS® metal panels

Many finishes possible for coverings, roofs and façades. No thermal bridges.

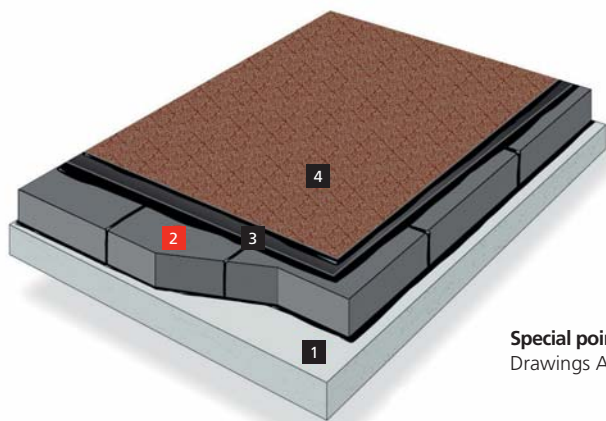
1 Aquarena aquatic centre





Guissan nautical centre – Chabanne and partner architects

FOAMGLAS® Compact Roof on reinforced concrete deck (accessible or with limited accessibility)



Special points
Drawings A - B (p. 41)

- 1 Concrete slab
- 2 FOAMGLAS® slabs laid in hot bitumen
- 3 First layer of bituminous waterproofing membrane
- 4 Second layer of bituminous or synthetic waterproofing membrane

Advantages of the system

- Impermeable to water and water vapour
- Eliminates the risks of condensation
- No vapour barrier
- High Compressive Strength
- Incombustible (A1)
- Constant thermal performance

Overview

- Concrete roof deck in accordance with relevant Codes of Practice & Building Regulations
- Application of a bituminous primer coat
- Cellular glass insulation type FOAMGLAS® T4+ (60 x 45 cm) fully bonded with bitumen adhesive, with a thermal guarantee over time, impermeable to water and water vapour, resistant to compression 6 kg/cm², fire classification A1
- Minimum 2 layers bituminous waterproofing membranes
- Insulation of upstands with FOAMGLAS® READY BLOCK

Complete overviews:
See data sheet
TDS 4.1.1

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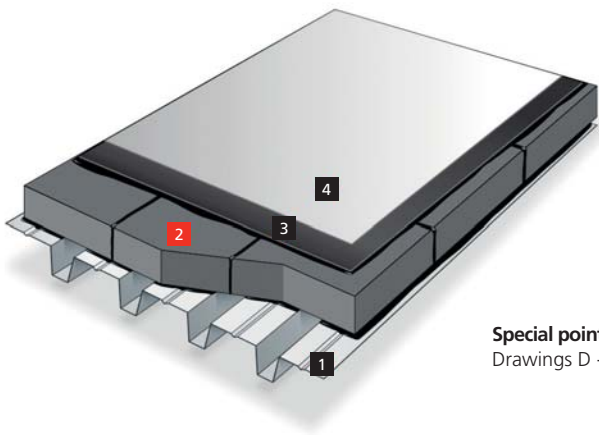
Fire
Euroclass A1

Options
FOAMGLAS® Tapered slabs with integrated gradient (1.1% - 1.7% - 2.2%)



Emin Leydier paper mill, Nogent sur Seine – BE Chleq et Froté

FOAMGLAS® Compact Roof on steel deck



Special points

Drawings D - E (p. 42), I (p. 43)

- 1 Trapezoidal metal deck
- 2 FOAMGLAS® slabs laid in hot bitumen
- 3 First layer of bituminous waterproofing membrane
- 4 Second layer of bituminous or synthetic waterproofing membrane

Advantages of the system

- Impermeable to water and vapour
- Eliminates the risks of condensation
- No vapour barrier
- No mechanical fasteners
- Incombustible (A1)
- Constant thermal performance

Overview

- Trapezoidal metal deck pre-coated & adapted for humid areas in accordance with relevant Codes of Practice & Building Regulations
- Cellular glass insulation type FOAMGLAS® T4+ (60 x 45 cm) fully bonded with bitumen adhesive, with a thermal guarantee over time, impermeable to water and vapour, resistant to compression 6 kg/cm², fire classification A1
- Minimum 2 layers of bituminous waterproofing membranes
- Insulation of upstands with FOAMGLAS® READY BLOCK

Complete overviews:

See data sheet
TDS 4.1.3

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Fire

Euroclass A1

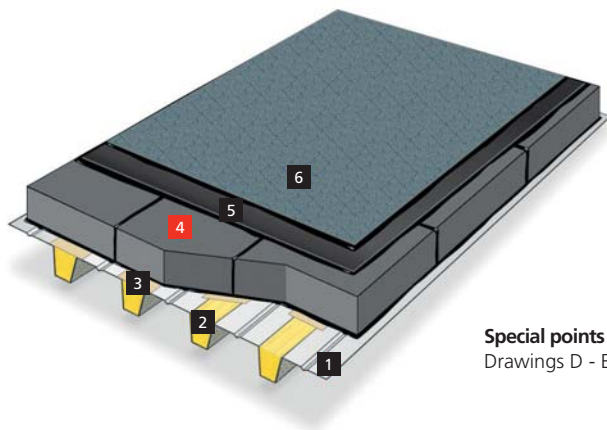
Acoustic performance

See page 10



Blagis swimming pool, Sceaux – Agence Eric Lemarié architect (photography: Hervé Abbadie)

FOAMGLAS® Compact Roof on perforated steel deck



Special points
Drawings D - E (p. 42) | (p.43)

- 1 Perforated trapezoidal metal deck
- 2 Sound absorbing
- 3 Self-adhesive membrane
- 4 FOAMGLAS® slabs laid in hot bitumen
- 5 First layer of bituminous waterproofing membrane
- 6 Second layer of bituminous or synthetic waterproofing membrane

Advantages of the system

- Impermeable to water and vapour
- Eliminates the risks of condensation
- Use of perforated acoustic sheet in very high humidity area
- Compact system: aesthetic, acoustic and hygrothermal
- Economical
- Incombustible (A1)
- No mechanical fastening

Overview

- Perforated corrugated steel deck pre-coated & adapted for humid areas in accordance with relevant Codes of Practice & Building Regulations
- Cellular Glass insulation type FOAMGLAS® T4+ (60 x 45 cm) fully bonded with bitumen adhesive, with a thermal guarantee over time, impermeable to water and vapour, resistant to compression 6 kg/cm², fire classification A1
- Minimum 2 layers of bituminous waterproofing membranes
- Insulation of upstands with FOAMGLAS® READY BLOCK

Complete overviews:
See data sheet
TDS 4.1.5
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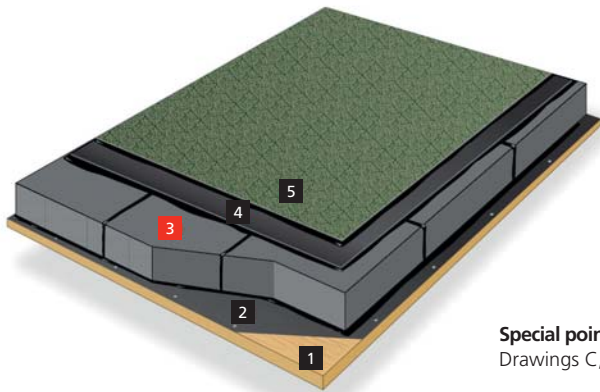
Fire
Euroclass A1

Acoustic performance
See page 10



Ozen aquatic centre – Xanadu architects

FOAMGLAS® Compact Roof on timber substrate



Special points

Drawings C, F and G (p. 41-42-43)

- 1 Timber substrate
- 2 Bituminous separating layer nailed on or self-adhered
- 3 FOAMGLAS® slabs laid in hot bitumen
- 4 First layer of bituminous waterproofing membrane
- 5 Second layer of bituminous or synthetic waterproofing membrane

Advantages of the system

- Solution validated for very humid environment on timber substrate
- Aesthetics
- No humidity or condensation
- Impermeable to water and water vapour

Overview

- Timber substrate or multilayer composite board , in accordance with the relevant Codes of Practice & Building Regulations
- Installation of the nailed underlayer in accordance with the relevant Codes of Practice & Building Regulations
- Cellular Glass insulation type FOAMGLAS® T4+ (60 x 45 cm) fully bonded with bitumen adhesive, with a thermal guarantee over time, impermeable to water and vapour, resistant to compression 6 kg/cm², fire classification A1
- Minimum 2 layers of bituminous waterproofing membranes
- Insulation of upstands with FOAMGLAS® READY BLOCK

Complete overviews:

See data sheet

TDS 4.1.6

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Fire

Euroclass A1

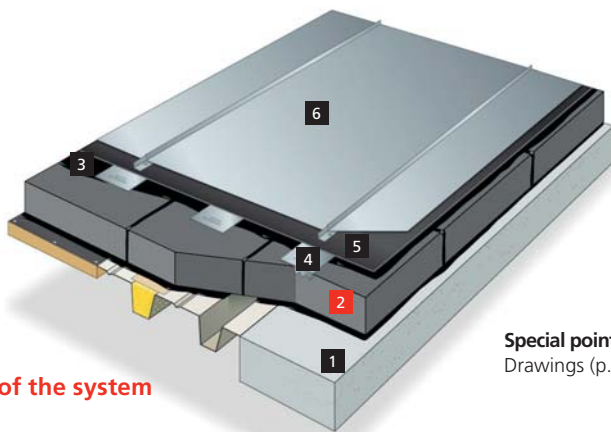
Acoustic performance

See page 10



Swimming Pool with Copper roofing, Alvaneu, Switzerland – Martin Stöhr architect

FOAMGLAS® Compact pitched roof with standing seam or profiled metal sheet (zinc, copper, aluminium...) on concrete, steel, timber substrate



Special points
Drawings (p. 41-42-43)

- 1 Concrete, steel, timber substrate
- 2 FOAMGLAS® slabs laid in hot bitumen
- 3 Top coat of hot bitumen
- 4 PC® SP 150/150 serrated fixing plates
- 5 Elastomeric reinforced bituminous waterproofing membrane (SBS with polyester reinforcement)
- 6 Standing seam or profiled metal sheet

Advantages of the system

- No ventilation: warm roof
- No risk of condensation
- No thermal bridge: no penetrating mechanical fastening
- Any finish and architectural design
- Impermeable to water and vapour
- Strong mechanical properties
- Incombustible (A1)

Overview

- Substrate (concrete, steel, timber) complying with relevant Codes of Practice & Building Regulations
- Installation of a nailed underlayer in accordance with relevant Codes of Practice & Building Regulations (for timber substrate only)
- Cellular Glass insulation type FOAMGLAS® T4+ (60 x 45 cm) fully bonded with bitumen adhesive, with a thermal guarantee over time, impermeable to water and vapour, resistant to compression 6 kg/cm², fire classification A1
- Top coat of hot bitumen, coverage +/- 2 mm thick. Positioning & placing metal plates in the FOAMGLAS® insulation. Number & spacing dependent on system-specific requirements & windloads.
- Polyester-reinforced elastomeric bituminous waterproofing membrane welded directly onto the whole surface. Joints tight-butted, torched and sealed.
- Installation of a separating layer if needed. Installation of the desired standing seam or profiled metal cladding.

Complete overviews:
See data sheets
TDS 4.6.1 - 4.6.2 -
4.6.4 - 4.6.5
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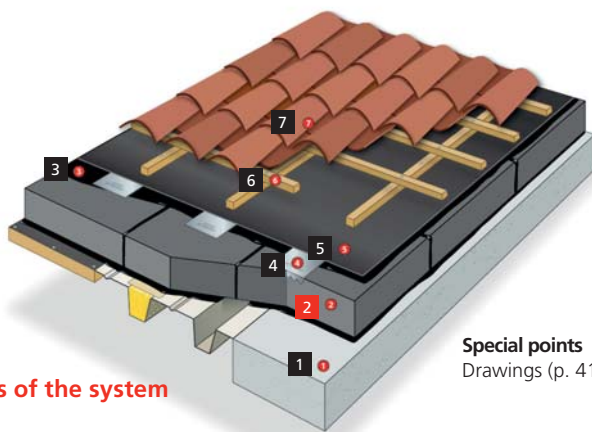
Fire
Euroclass A1

Acoustic performance
See page 10



Le Lagon aquatic area, Tignes – DHA architects

FOAMGLAS® pitched roof on concrete, steel or timber substrate with a slate or tiled finish



Special points
Drawings (p. 41-42-43)

Advantages of the system

- No ventilation: warm roof
- No risk of condensation
- No thermal bridge: no penetrating mechanical fastener
- Any finish and architectural design
- Impermeable to water and vapour
- Strong mechanical properties

Overview

- Substrate element (concrete, steel, timber) complying with relevant Codes of Practice & Building Regulations
- Installation of a nailed under layer in accordance with relevant Codes of Practice & Building Regulations (for timber substrate only)
- Cellular Glass insulation type FOAMGLAS® T4+ (60 x 45 cm) fully bonded with bitumen adhesive with full bonding, with a thermal guarantee over time, impermeable to water and vapour, resistant to compression 6 kg/cm², fire classification A1
- Top coat of hot bitumen, coverage +/- 2mm thick. Positioning & placing metal plates in the FOAMGLAS® insulation. Number & spacing dependent on system-specific requirements & wind loads.
- Polyester-reinforced elastomeric bituminous waterproofing membrane welded directly onto the whole surface. Joints tight-butted, torched and sealed.
- Installation of the rafters & of the desired small elements according to the manufacturer

- 1 Concrete, steel, timber substrate
- 2 FOAMGLAS® slabs laid in hot bitumen
- 3 Top coat of hot bitumen
- 4 PC® SP 150/150 serrated fixing plates
- 5 Elastomeric reinforced bituminous waterproofing membrane (SBS with polyester reinforcement)
- 6 Rafters fixed on the metal plates
- 7 Small element covering (tiles, slates, etc.)

For technical data sheet contact us
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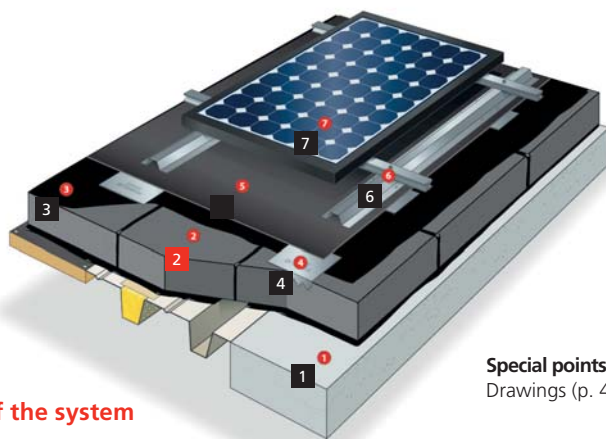
Fire
Euroclass A1

Acoustic performance
See page 10



Swimming pool du Lac, Savenay – DMT architects

FOAMGLAS® insulation with solar panels on concrete, steel or timber substrate



Special points
Drawings (p. 41-42-43)

- 1 Concrete, steel, timber substrate
- 2 FOAMGLAS® slabs laid in hot bitumen
- 3 Top coat of hot bitumen
- 4 PC® SP 150/150 serrated fixing plates
- 5 Elastomeric reinforced bituminous waterproofing membrane (SBS with polyester reinforcement)
- 6 Substructure
- 7 Solar panels

Advantages of the system

- Impermeable to water and vapour
- Eliminates the risks of condensation
- No thermal bridge or penetrating fastening
- Insulation value & mechanical properties will remain constant over the full operating life of the building

Overview

- Supporting element (concrete, steel, timber) complying with relevant Codes of Practice & Building Regulations
- Installation of a nailed under layer in accordance with relevant Codes of Practice & Building Regulations (for timber substrate only)
- Cellular Glass insulation type FOAMGLAS® T4+ (60 x 45 cm) fully bonded with bitumen adhesive, with a thermal guarantee over time, impermeable to water and vapour, resistant to compression 6 kg/cm², fire classification A1
- Top coat of hot bitumen, coverage +/- 2mm thick. Positioning & placing metal plates in the FOAMGLAS® insulation. Number & spacing dependent on system-specific requirements & wind loads.
- Polyester-reinforced elastomeric bituminous waterproofing membrane welded directly onto the whole surface. Joints tight-butted, torched and sealed.
- Substructure mechanically fixed into the metal plates & photovoltaic solar panel installed onto the substructure
- Insulation of upstands with FOAMGLAS® READY BLOCK

For technical data sheet contact us
www.foamglas.com

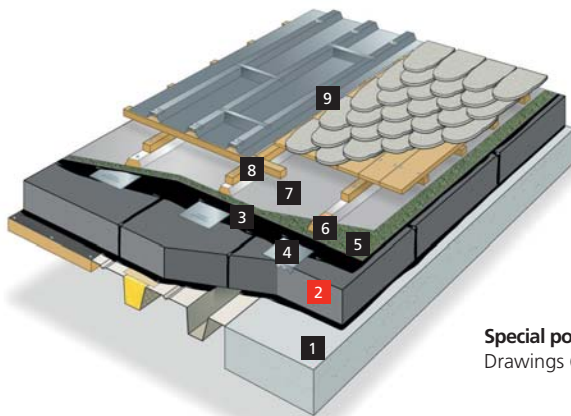
Fire
Euroclass A1

Acoustic performance
see page 10



Aquariaz, Avoriaz – AAA architecture and Jacques Labro

FOAMGLAS® pitched roof in a high altitude climate on concrete, steel or timber substrate



Special points
Drawings (p. 41-42-43)

- 1 Concrete, steel, timber substrate
- 2 FOAMGLAS® slabs laid in hot bitumen
- 3 Top coat of hot bitumen
- 4 PC® SP 150/150 serrated fixing plates
- 5 Elastomeric bituminous waterproofing membrane (SBS with polyester reinforcement)
- 6 Trapezoidal rafters
- 7 Bituminous waterproofing membrane
- 8 Batters
- 9 Finishing (small covering elements, ...)

Advantages of the system

- Validated technical note for all types of support (French certification)
- Complete absence of thermal bridges
- Roof completely air, water & vapour tight
- Sustainability of the thermal performance

Overview

- Supporting element (concrete, steel, wood) complying with relevant Codes of Practice & Building Regulations
- Installation of a nailed under layer in accordance relevant Codes of Practice & Building Regulations
- Cellular Glass insulation type FOAMGLAS® T4+ (60 x 45 cm) fully bonded with bitumen adhesive, with a thermal guarantee over time, impermeable to water and vapour, resistant to compression 6 kg/cm², fire classification A1
- Top coat of hot bitumen, coverage +/- 2 mm thick. Positioning & placing metal plates in the FOAMGLAS® insulation. Number & spacing dependent on system-specific requirements & wind loads.
- Polyester-reinforced elastomeric bituminous waterproofing membrane welded directly onto the whole surface. Joints tight-butted, torched and sealed.
- Fastening of the rafters into the metal plates and installation of the desired small elements according to the manufacturer

For technical data sheets: contact us
www.foamglas.com

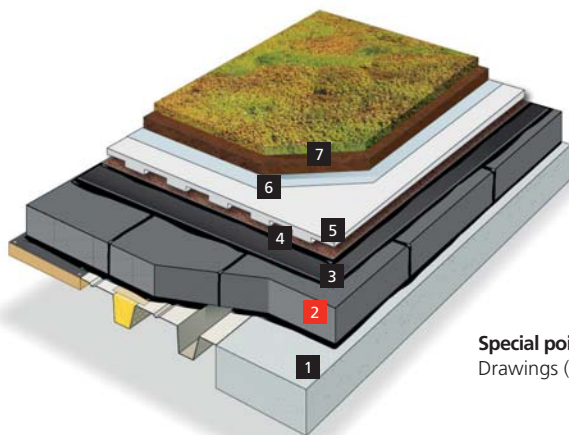
Fire
Euroclass A1

Acoustic performance
See page 10



"Vague" aquatic centre, Soisy sous Montmorency – Jacques Rougerie architects

FOAMGLAS® Compact Green roof on concrete, steel & timber substrate



Special points
Drawings (p. 41-42-43)

- 1 Concrete, steel, timber substrate
- 2 FOAMGLAS® slabs laid in hot bitumen
- 3 First layer of bituminous waterproofing membrane
- 4 Second layer Anti-root - Bituminous waterproofing membrane
- 5 Drain
- 6 Filter
- 7 Planting (extensive or intensive)

Advantages of the system

- Impermeable to water and vapour
- No condensation or humidity
- Anti-root system
- Incompressible
- Incombustible (A1)
- No risk of infiltrations

Overview

- Supporting element (concrete, steel, timber) complying with relevant Codes of Practice & Building Regulations
- Installation of a nailed under layer in accordance with relevant Codes of Practice & Building Regulations (for timber substrate only)
- Cellular Glass insulation type FOAMGLAS® T4+ (60 x 45 cm) fully bonded with bitumen adhesive, with a thermal guarantee over time, impermeable to water and vapour, resistant to compression 6 kg/cm², fire classification A1
- Minimum 2 layers of bituminous waterproofing membranes (Top layer must be anti-root)
- Protection by a drainage device, filter and substrate
- Insulation of upstands with FOAMGLAS® READY BLOCK

Complete overviews:
See our TDS
4.4.1 - 4.4.3 - 4.4.5
www.foamglas.com

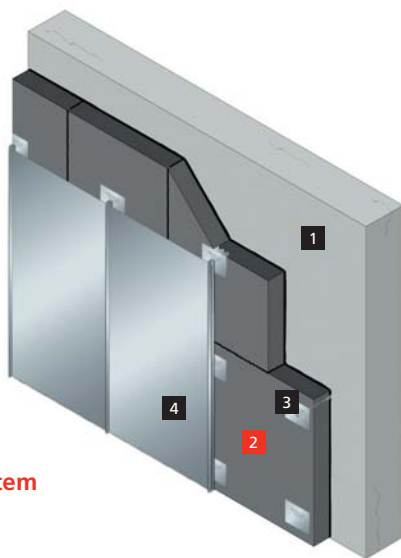
Fire
Euroclass A1

Acoustic performance
See page 10



Aquapark, Brno – Kohoutovice, Czech Republik – Architect Atelier K4

Composite Façade system with standing seam or profiled metal cladding on concrete and timber substrate



- 1 Substrate (concrete, timber)
- 2 FOAMGLAS® slabs bonded with PC® 56 adhesive
- 3 PC® SP 150/150 perforated serrated fixing plates fixed into the substrate
- 4 Standing Seam or profiled metal cladding

Advantages of the system

- Thermal durability
- Incombustible (A1)
- No ventilation (no substructure)
- Impermeable to water and water-vapour (no water vapour barrier & no rain barrier)
- Totally air tight
- No compression
- Dimensional stability (it cannot shrink or swell)

Overview

- Solid walls constructed in accordance with relevant Codes of Practice & Building Regulations
- Application of a primer on dust-free surface
- Cellular Glass insulation type FOAMGLAS® W+F (60 x 45 cm) fully bonded with PC® 56 adhesive, with a thermal guarantee over time, impermeable to water and vapour, resistance to compression 3.5 kg/cm², fire classification A1
- Installation of pre-drilled serrated fixing plates onto the insulation and then mechanically fastened to the substrate
- Installation of the finishes by fastening to metal plates

Complete overviews:
See data sheet
TDS 2.2.7
www.foamglas.com

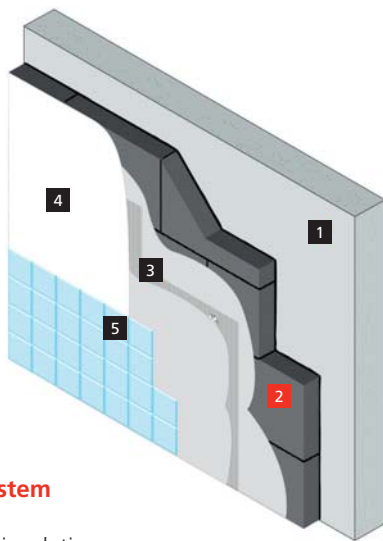
Fire
Euroclass A1

Acoustic performance
See page 10



Community kitchen of Louis Pasteur school), Villejuif – Atelier d'architecture Malisan

Interior wall insulation with roughcast render or tiles



- 1 Substrate
- 2 FOAMGLAS® T4+ slabs fully bonded with PC® 56 adhesive
- 3 Base Coat PC® 164 with reinforcing mesh PC® 150
- 4 Roughcast render PC® 78
- 5 Tiles bonded to PC® 164 base coat

Advantages of the system

- No condensation in the insulation
- Preservation of the interior finish (no blistering, peeling...)
- Protection of the interior atmosphere – no VOC (class A+)
- Impermeable to water and water vapour
- Prevents the growth of mould

Overview

- Solid walls constructed in accordance with relevant Codes of Practice & Building Regulations
- Application of a primer on dust-free surface
- Cellular Glass insulation type FOAMGLAS® T4+ (60 x 45 cm) fully bonded with PC® 56 adhesive, with a thermal guarantee over time, impermeable to water and vapour, resistance to compression 3.5 kg/cm², fire classification A1
- Installation of the base coat PC® 164 incorporating a PC® 150 reinforcement mesh
- Installation of the finish coating PC® 78 or the ceramic wall covering

Complete overviews:
See data sheets TDS
3.2.2 - 3.2.5
www.foamglas.com

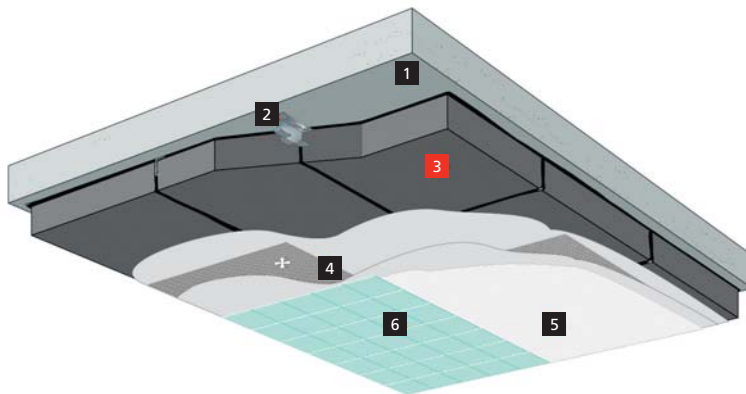
Fire
Euroclass A1

Acoustic performance
See page 10



Bathing Hotel Trescher, Titisee-Neustadt, germany – Architect Robert Rappold

Soffit insulation system with roughcast render or tiles



- 1 Concrete slab
- 2 Mechanical fastening with anchors PC® F (4/m²)
- 3 FOAMGLAS® T4+ slabs fully bonded with PC® 56 adhesive
- 4 Base Coat PC® 164 with reinforcing mesh PC® 150
- 5 Roughcast render PC® 78
- 6 Tiles bonded to PC® 164 base coat

Advantages of the system

- Impermeable to water and water vapour
- No condensation in the insulation
- Preservation of the interior finish (no blistering, peeling, mould...)
- Protection of the interior atmosphere – no VOC (class A+)
- No thermal bridge (F anchor mechanical fastening)

Descriptif

- Ceilings completed in accordance with relevant Codes of Practice & Building Regulations
- Application of a primer on dust-free surface
- Cellular Glass insulation type FOAMGLAS® T4+ (60 x 45 cm) fully bonded with PC® 56 adhesive and mechanically fastened with a PC® F anchor lug, with a thermal guarantee over time, impermeable to water and vapour, resistance to compression 3.5 kg/cm², fire classification A1
- Installation of the base coat PC® 164 incorporating a PC® 150 reinforcement mesh
- Installation of the finish coating PC® 78 or the ceramic wall covering

Complete overviews:
See data sheet
TDS 3.3.2
www.foamglas.com

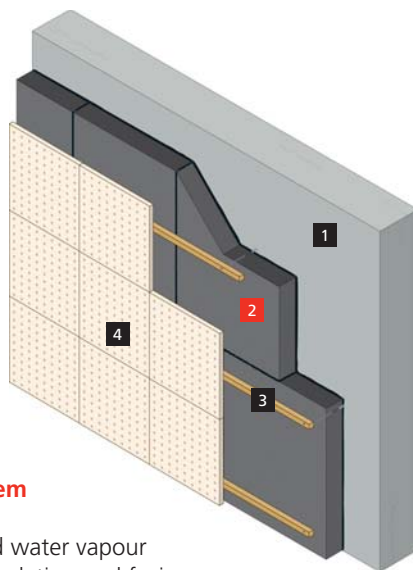
Fire
Euroclass A1

Acoustic performance
See page 10



Hotel Sackmann, Wellness & SPA, Baiersbronn, germany – Architect Albert Vögele

Interior Wall Insulation with facing wall



- 1 Solid wall
- 2 FOAMGLAS® slabs fully bonded with PC® 56 adhesive
- 3 Substructure fixed mechanically
- 4 Facing Wall (acoustic panel shown as an example)

Advantages of the system

- Impermeable to water and water vapour
- No condensation in the insulation and facing
- Preservation of the acoustic performance of the facing
- Protects indoor air – no VOC (class A+)

Overview

- Solid walls constructed in accordance with relevant Codes of Practice & Building Regulations
- Application of a primer on dust-free surface
- Cellular Glass insulation type FOAMGLAS® T4+ (60 x 45 cm) fully bonded with PC® 56 adhesive, with a thermal guarantee over time, impermeable to water and vapour, resistance to compression 3.5 kg/cm², fire classification A1
- Fastening of the substructure in the support
- Mounting of the acoustic panels on the secondary substructure

Complete overviews:
See data sheet
TDS 3.2.9
www.foamglas.com

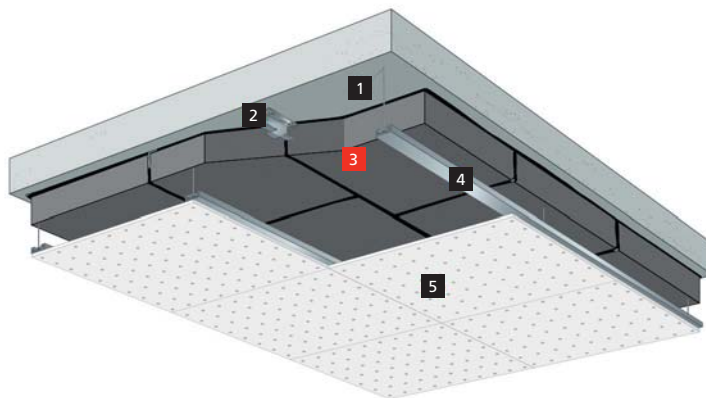
Fire
Euroclass A1

Acoustic performance
See page 10



Residential Park Töpfer, Rheinfelden, germany, Lietzow Architect

Soffit Insulation with plasterboard or panels mounted on timber or metal substructure



- 1 Concrete slab
- 2 Mechanical fastening with anchors PC® F (4/m²)
- 3 FOAMGLAS® T4+ slabs fully bonded with PC® 56 adhesive
- 4 Substructure
- 5 Panelling (acoustic panel in this case)

Advantages of the system

- Impermeable to water and water vapour
- No condensation in the ceiling void and insulation
- Preservation of the acoustic performance
- Protection of the interior atmosphere – no VOC (class A+)

Overview

- Ceilings to be completed in accordance with relevant Codes of Practice & Building Regulations
- Application of a primer on dust-free surface
- Cellular Glass insulation type FOAMGLAS® T4+ (60 x 45 cm) fully bonded with PC® 56 adhesive and mechanically fastened with a PC® F anchor lug, with a thermal guarantee over time, impermeable to water and vapour, resistance to compression 3.5 kg/cm², fire classification A1
- Installation of the secondary frame mounted directly in the support
- Installation of the acoustic ceiling on the secondary frame

Complete overviews:
See data sheet
TDS 3.3.5
www.foamglas.com

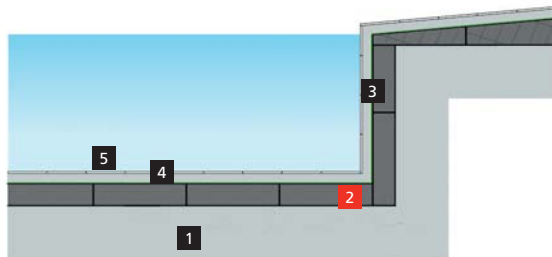
Fire
Euroclass A1

Acoustic performance
See page 10



(Snow Eagle spa hotel, Val d'Isère – D.Pinard)

Complete FOAMGLAS® insulation solutions for pool and floor



- 1 Concrete slab
- 2 FOAMGLAS® slabs fully bonded with bitumen adhesive
- 3 Separation layer
- 4 Waterproof concrete
- 5 Liner or tiled finish

Advantages of the system

- Sustained reduction of the thermal bridge (pool 21°C / ground ~ 15°C)
- Impermeable and rot-proof insulation
- Incompressible insulation (guaranteed compressive strength)
- Insensitive to chlorine
- Outstanding system stability

Overview

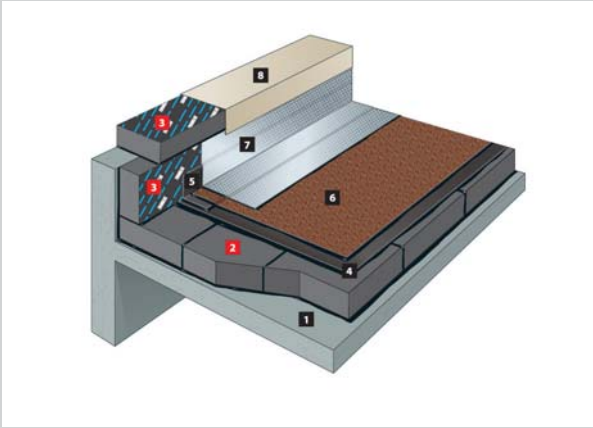
- Concrete complying with relevant Codes of Practice & Building Regulations
- Cellular Glass insulation type FOAMGLAS® FLOOR BOARD (120 x 60 cm), free installation with sealed joints, with a thermal guarantee over time, impermeable to water and vapour, resistance to compression 6 kg/cm²
- Separation layer positioned with overlap
- Installation of a waterproof concrete
- Finishes (tiles, liner)

Complete overviews:
See data sheet
TDS 1.1.1
www.foamglas.com

Options
 FOAMGLAS®
 tapered slabs

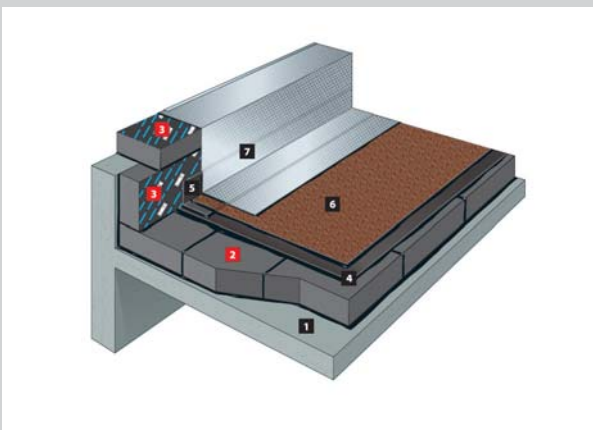
Drawings (Cross sections)

Detail A: Concrete parapet on concrete slab (capping)



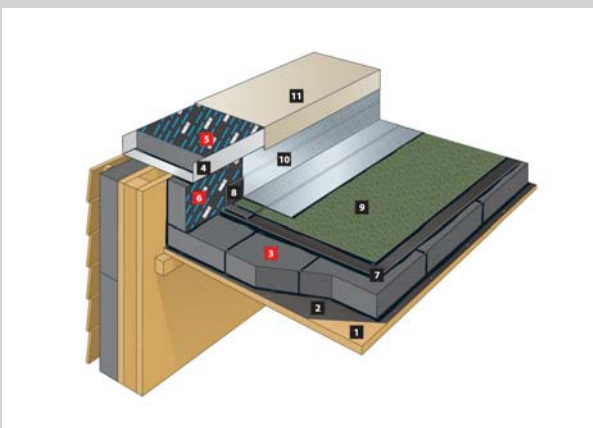
- 1 Concrete slab
- 2 FOAMGLAS® slabs laid in hot bitumen
- 3 FOAMGLAS® READY BLOCK® slabs laid in hot bitumen or with cold adhesive PC® 56
- 4 First layer of bituminous waterproofing membrane
- 5 Corner reinforcement
- 6 2nd layer of bituminous or synthetic waterproofing membrane
- 7 Elastomer cover with aluminium sheet or mineral slate finish protection
- 8 Capping Detail

Detail B: Concrete parapet on concrete slab with aluminium cover



- 1 Concrete slab
- 2 FOAMGLAS® slabs laid in hot bitumen
- 3 FOAMGLAS® READY BLOCK® slabs laid in hot bitumen or with cold adhesive PC® 56
- 4 First layer of bituminous waterproofing membrane
- 5 Corner reinforcement
- 6 2nd layer of bituminous or synthetic waterproofing membrane
- 7 Elastomer cover with aluminium sheet or mineral slate finish protection

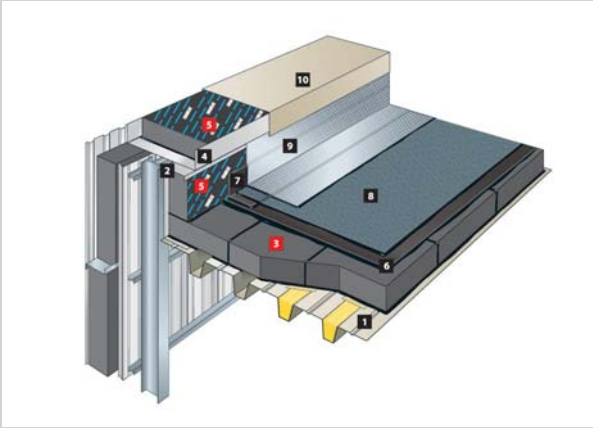
Detail C: Timber parapet on timber substrate



- 1 Timber panel
- 2 Nailed bituminous membrane
- 3 FOAMGLAS® slabs laid in hot bitumen
- 4 Metal bracket
- 5 FOAMGLAS® READY BLOCK® slabs fully bonded
- 6 FOAMGLAS® READY BLOCK® slabs fully bonded
- 7 First layer bituminous waterproofing membrane
- 8 Corner reinforcement
- 9 2nd layer of bituminous or synthetic waterproofing membrane
- 10 Elastomer cover with aluminium sheet or mineral slate finish protection
- 11 Capping Detail

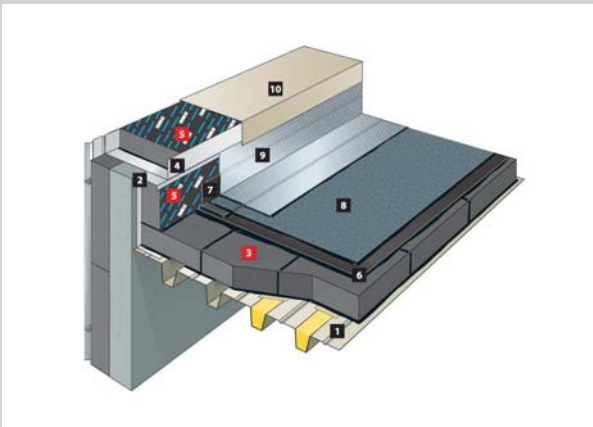
Drawings (Cross sections)

Detail D: Metal parapet on corrugated metal deck



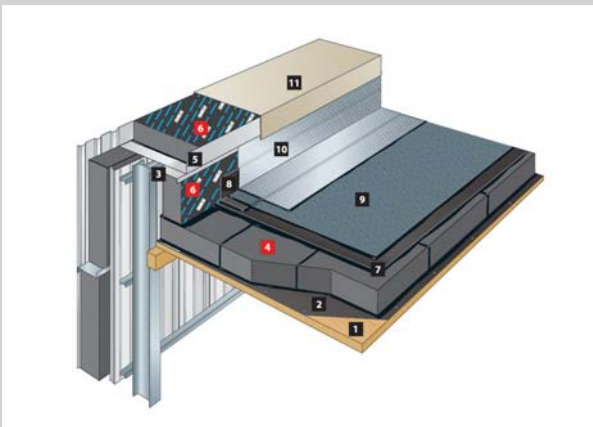
- 1 Corrugated metal deck
- 2 Metal frame
- 3 FOAMGLAS® slabs laid in hot bitumen
- 4 Metal bracket
- 5 FOAMGLAS® READY BLOCK slabs hot bonded
- 6 First layer of bituminous waterproofing membrane
- 7 Corner reinforcement
- 8 Elastomer cover with aluminium sheet or mineral slate finish protection
- 9 2nd layer of bituminous or synthetic waterproofing membrane
- 10 Capping detail

Detail E: Concrete parapet on corrugated metal deck



- 1 Corrugated metal deck
- 2 Metal frame
- 3 FOAMGLAS® slabs laid in hot bitumen
- 4 Metal bracket
- 5 FOAMGLAS® READY BLOCK slabs hot bonded
- 6 First layer of bituminous waterproofing membrane
- 7 Corner reinforcement
- 8 Elastomer cover with aluminium sheet or mineral slate finish protection
- 9 2nd layer of bituminous or synthetic waterproofing membrane
- 10 Capping detail

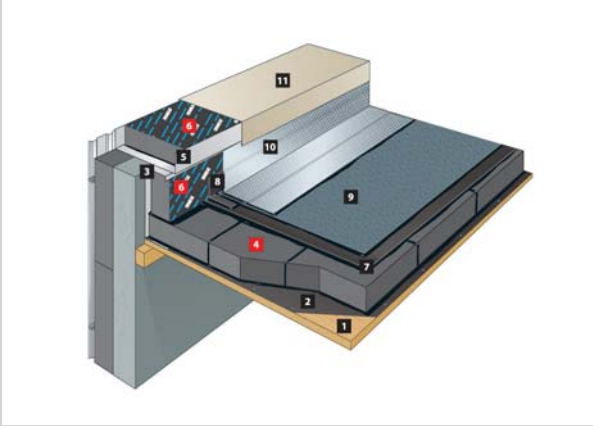
Detail F: Metal parapet on timber substrate



- 1 Timber substrate
- 2 Nailed bituminous membrane
- 3 Metal frame
- 4 FOAMGLAS® slabs laid in hot bitumen
- 5 Metal bracket
- 6 FOAMGLAS® READY BLOCK slabs hot bonded
- 7 First layer of bituminous waterproofing membrane
- 8 Corner reinforcement
- 9 2nd layer of bituminous or synthetic waterproofing membrane
- 10 Elastomer cover with aluminium sheet or mineral slate finish protection
- 11 Capping detail

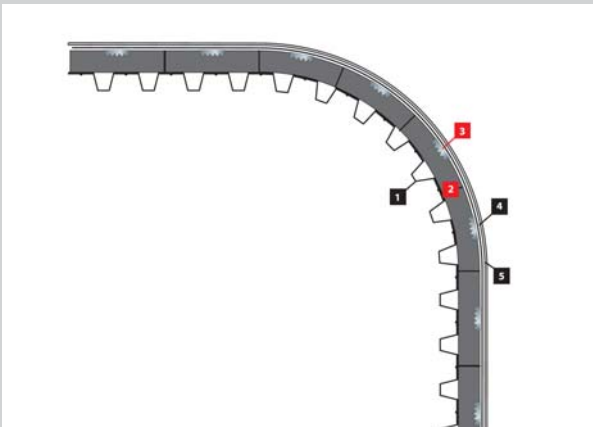
Drawings (Cross sections)

Detail G: Concrete parapet on timber substrate



- 1 Timber substrate
- 2 Nailed bituminous membrane
- 3 Metal frame
- 4 FOAMGLAS® slabs laid in hot bitumen
- 5 Metal bracket
- 6 FOAMGLAS® READY BLOCK slabs hot bonded
- 7 First layer of bituminous waterproofing membrane
- 8 Corner reinforcement
- 9 2nd layer of bituminous or synthetic waterproofing membrane
- 10 Elastomer cover with aluminium sheet or mineral slate finish protection
- 11 Capping detail

Detail H: Roof-Façade transition



- 1 Corrugated metal deck
- 2 FOAMGLAS® slabs laid in hot bitumen
- 3 FOAMGLAS® metal plates
- 4 First layer of bituminous waterproofing membrane
- 5 Metal finishes or bi-layers of waterproofing membranes

Detail I: FOAMGLAS® void filler



- 1 Corrugated metal deck
- 2 FOAMGLAS® void filler bonded with cold adhesive
- 3 FOAMGLAS® counter-void filler bonded with cold adhesive

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FOAMGLAS®
Building

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