IRISH AGRÉMENT BOARD
CERTIFICATE NO. 06/0161
Greenspan System Sales Ireland Limited,
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Aquapanel Exterior Cement Board System

Panneaux de façade
Verkleidungsplatten

NSAI Agrément (Irish Agrément Board) is designated by Government to issue European Technical Approvals.

NSAI Agrément Certificates establish proof that the certified products are **'proper materials'** suitable for their intended use under Irish site conditions, and in accordance with the **Building Regulations 1997 to 2014**.

PRODUCT DESCRIPTION:

This Certificate relates to Aquapanel Exterior Cement Board System, comprised of aggregated Portland Cement board reinforced with polymer-coated glass fibre mesh, designed for fire and water resistant external cladding with other specific and complementary components to form an Aquapanel ventilated system for use as an exterior wall cladding in timber frame houses and apartments (Detail Sheet 1) and steel frame houses and apartments (Detail Sheet 2) of up to six storeys in height (Detail Sheet 3). The system is certified for use on structures that meet NSAI standards and comply with the Building Regulations 1997 to 2014. The system can also be used for penthouses which have a paved area for inspection and maintenance. This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2014.

USE:

The Aquapanel Exterior Cement Board as certified in this INSAI Agrément Certificate is for use as an exterior wall panel system in timber frame and steel frame buildings of up to six storeys in height – this includes detached, semi-detached and terraced houses.

MANUFACTURE AND MARKETING:

The product is manufactured by:

Knauf Aquapanel GmbH & Co. KG,
Kipperstrasse 19,
D-44147 Dortmund,
Germany.
Tel: 0049 231 88085521
Fax: 0049 231 88085531

The product is marketed by:

Greenspan System Sales Ireland Limited,
Ballyhahill,
Co. Limerick.
Tel: 069 82222
Fax: 069 82226
E-mail: info@greenspan.ie
Website: www.greenspan.ie

1.1 ASSESSMENT

In the opinion of NSAI Agrément, Aquapanel Exterior Cement Board when used as specified in this Certificate is satisfactory for the purpose defined above, and can meet the requirements of the Building Regulations 1997 to 2014, as indicated in Section 1.2 of this NSAI Agrément Certificate.

1.2 BUILDING REGULATIONS 1997 to 2014 REQUIREMENT:

Part D – Materials and Workmanship

D3 – Aquapanel Exterior Cement Board, as certified in the NSAI Agrément Certificate, is comprised of 'proper materials' fit for their intended use (see Parts 2, 3 and 4 of this Certificate).

D1 – Aquapanel Exterior Cement Board, as certified in this Certificate, can meet the requirements for workmanship.

Part A – Structure

A1 – Loading

Aquapanel Exterior Cement Board, as certified in this Certificate for use in the Aquapanel ventilated system as designed by Knauf Aquapanel in association with Greenspan, has adequate strength and stability (see Parts 3 and 4 of this Certificate).

Part B – Fire Safety

B3 – Internal Fire Spread (Structure)

Each face of Aquapanel Exterior Cement Board is considered Class 0 and when installed with a residual cavity between it and the next layer of construction, will require the provision of cavity barriers as indicated in sections 2.1 and 3.3 of TGD to Part B, Fire Safety, of the Building Regulations 1997 to 2014, and may be used in buildings of every purpose group (see Section 4.1 of this Certificate).

The design specified in the Knauf Aquapanel Aquapanel ventilated exterior wall panel system (refer to Greenspan Architectural Details Manual) can incorporate suitable cavity barriers and fire stops as set out in section 3.3 of TGD to Part B of the Building Regulations 1997 to 2014, and can meet the requirements of B3 in respect of the provision of cavity barriers and fire stops.

B4 – External Fire Spread

It will be necessary to apply a 1m space separation from the boundary as per Table 4.1 of the Technical Guidance Document to Part B of the Building Regulations 1997 to 2014. However, when the Aquapanel mineralic finish is used, the product can be used within 1m of a boundary wall. The Aquapanel board itself and base coat are non-combustible. As an external cladding sheet for panels constructed in accordance with the Aquapanel ventilated external wall panel system, and where it is used on buildings adequately designed in respect of fire safety, the product can meet the relevant requirements of Regulation B4 both in respect of externally exposed wall surfaces and surfaces exposed within concealed cavities.

Part C – Site Preparation and Resistance to Moisture

C4 – Resistance to Weather and Ground Moisture

Aquapanel Exterior Cement Board used as designed and specified by Knauf Aquapanel in their Aquapanel ventilated exterior wall panel system and in accordance with Part 3 of this Certificate, will have adequate weather resistance in all exposures, will resist the passage of moisture from whatever source and will prevent surface or interstitial condensation.

Part F – Ventilation

F1 – Means of Ventilation

Adequate building ventilation openings can be provided in walls constructed with the Aquapanel Exterior Cement Board cladding system. It is essential that ventilation ducts through such walls are fully sealed from any cavities within the walls or from contact with the cut edges of adjacent materials.

Part J – Heat Producing Appliances

J3 – Protection of Building

When used in accordance with Section 4.1 of this Certificate, Aquapanel Exterior Cement Board can meet the Regulation requirements.

Part L – Conservation of Fuel and Energy

L1 – Conservation of Fuel and Energy

The design specified in the Aquapanel ventilated exterior wall panel system incorporates thermal insulating materials and vapour and moisture barriers and can meet the requirements of L1 in respect of the conservation of fuel and energy, the reduction of surface condensation and the prevention of interstitial condensation.

2.1 PRODUCT DESCRIPTION

This Certificate relates to Aquapanel Exterior Cement Board System, consisting of aggregated Portland Cement board reinforced with polymer-coated glass fibre mesh, designed for fire and water resistant external cladding with other specific and complementary components to form an Aquapanel ventilated system in timber framed and steel framed buildings. The exterior cladding panel system has been developed and designed by Knauf Aquapanel specifically for use in house construction in Ireland where exterior cladding is expected to have a design life of sixty years with only minimal periodic maintenance: for Knauf Aquapanel and Greenspan this involved:

(a) re-design of the building details, and
(b) development and scheduling the procedures for controlling quality of all workmanship including site installation.

To achieve this Knauf Aquapanel worked with their agents, Greenspan, and their local architectural consultants. In respect of the primary objective is the achievement of satisfactory water management performance for external walls to cope with driving rain, and the related enhancement of design life through increased durability and reduced maintenance. The re-design of the building details for Irish application of the system included the introduction of a 38mm ventilated and drained vertical cavity behind the Aquapanel Exterior Cement Board and the ensuring of satisfactory water management outwards through the system under driving rain conditions.

Typical specifications and construction details relating to (a) above are contained in the *"Greenspan Products Architectural Details Manual".*

It is intended that design, supply and installation of the Aquapanel system is the responsibility of Greenspan. This involves the use of trained and approved installers.

The product, when used in accordance with the manufacturer's and marketing company's instructions, forms a weather proof building cladding system. The external finishing coat allows for various colours and trowel textures.

There are eight main elements in the system:

- Aquapanel Exterior Cement Board – 12.5mm thick x 2.4m x 0.9m.
- Aquapanel Façade Fixing Screws in stainless steel to fix the panels onto the battens.
- Aquapanel Exterior Reinforcing Tape for reinforcing the mortar joints between the boards.
- Aquapanel Joint Filler, a cement-bound material to fix the Aquapanel Exterior Reinforcing Tape.
- Aquapanel Exterior Basecoat, a polymer modified Portland cement material for use as basecoat.
- Aquapanel Exterior Reinforcing Mesh, a wide-meshed glass reinforcing fabric to reinforce the basecoat matrix.
- Aquapanel Exterior Primer, synthetic dispersant with high alkali resistance to reduce suction variations in the basecoat for the application of Aquapanel Exterior finishes.
- Aquapanel Exterior Silicon Synthetic Resin Plaster, or Aquapanel exterior dispersion plaster, both coloured plasters to give a textured finish to the system. For buildings for limited applications, e.g. bay windows, the Marmorit range of mineral finishes or approved Monocouche renders can be used, as can a sand and cement render 3:1 mix which incorporates 0.28 part of Everbuild SBR Bond or equivalent admixture - see Detail Sheet 3 for finish to be used on buildings in excess of 2 storeys in height. For further information on the Monocouche, and sand and cement renders, contact Greenspan Technical Department for a product application method statement.

There are other elements available as accessories as follows:

- Damp-proof adhesive membrane tape for flashing around window opes.
- Stainless steel staples for long term security of the damp-proof adhesive membrane tape.
- Starter Track, aluminium or PVC ventilator tracks with insect guard, stainless steel movement joint kit for movement at first floor level and PVC plaster beads.
- Window cill corner flashing unit.

The exterior finish is available in a range of colours and textures.

2.2 MANUFACTURE

2.2.1 General

Aquapanel Exterior Cement Board is manufactured from aggregated Portland Cement with coated glass-fibre mesh reinforcement on each face giving board with good flexible characteristics and a durable surface to accept traditional finishing techniques including joint mortar, Knauf Aquapanel Aquapanel Exterior Basecoat, Knauf Aquapanel Aquapanel Exterior

Textured Finish, and other approved surface coating systems. After manufacture, the boards are bundled, packaged, and labelled ready for dispatch.

2.2.2 Product Quality Control

Quality control includes checks on dimensions, density, flexural and compressive strength tests. Knauf Aquapanel operates a quality management system.

2.3 DELIVERY, STORAGE AND MARKING

2.3.1 Aquapanel Exterior Cement Board

The Aquapanel Exterior Cement Boards are shrink-wrapped with polyethylene and palletised, 25 to 35 sheets per pallet, and should where possible be stored inside a building and stacked on a level base with supports every 450mm. Each pack carries a label bearing the manufacturer's name, product description, quantity per pack, NSAI Agrément identification mark, NSAI Agrément Certificate number and essential instructions for storage and installation.

2.3.2 Aquapanel Exterior Reinforcing Tape

Aquapanel Exterior Reinforcing Tape is supplied in 25m shrink-wrapped rolls (50m a roll) with a label carrying the manufacturer's name, product description, quantity contained and NSAI Agrément identification mark bearing the number of this Certificate and essential instructions for storage and installation.

2.3.3 Aquapanel Exterior Basecoat

Aquapanel Exterior Basecoat is supplied to site in shrink-wrapped 25kg bags with a label carrying the manufacturer's name, product description, quantity contained, and NSAI Agrément identification mark bearing the number of this Certificate and essential instructions for storage and installation.

2.3.4 Aquapanel Exterior Silicon Synthetic Resin Plaster

Aquapanel Exterior Silicon Synthetic Resin Plaster is supplied to site in 25kg pails, shrink-wrapped with a label carrying the manufacturer's name, product description, quantity contained and NSAI Agrément identification mark bearing the number of this Certificate and essential instructions for storage and installation. The special stainless steel fixing screws and all materials necessary to complete the Knauf Aquapanel ventilated system for use in Ireland are supplied only by Greenspan.

2.4 INSTALLATION PROCEDURE

2.4.1 Quality Control of Installation

Knauf Aquapanel together with their Irish representatives, Greenspan, have implemented formal procedures to achieve the necessary quality and reliability for all workmanship involved in site installation including panel fabrication whether carried out on site or in an assembly area. Only Greenspan trained and registered installers will:

- Carry out installation of the system,
- Undertake inspections prior to installation and as the work is progressed,
- Audit the completion of the designed and scheduled checklist on each site project with a representative of Greenspan,
- Verify that a warranty of the installation by Knauf Aquapanel Is in place, and
- Keep a detailed log of all sites on which installations have been completed.

The panels for fitting on site must be cut and fabricated accurately, true to square and carefully fitted without gaps or uneven junctions. Installations should be signed off by a Greenspan technical representative with experience relevant to the Aquapanel system.

2.4.2 Cavity Barriers and Fire Stops

To meet the requirements of the Building Regulations 1997 to 2014 cavity barriers and fire stops must be provided in the construction of all framed walls as follows:

- Cavity barriers must be installed around all openings such as doors, windows, vents, extractor fans and metre cupboards.
- Cavity barriers must also be installed at eaves and verges, including for detached houses.
- In semi-detached and terraced houses both cavity barriers and fire stops must be installed at the junction of party walls and external walls.

All timber and steel frame must be designed by a chartered structural engineer. Battens for fixing the Aquapanel Exterior Cement Boards must be securely fixed to timber battens/steel frame. Calculations should be carried out by the chartered engineer. The batten fixings should also be examined by the chartered engineer.

Where a panel is proposed in the vicinity of a fireplace or chimney then careful detailing is required around the fire recess opening, chimney breast or flue to ensure that any combustible material is adequately separated, in accordance with the requirements of Part J of the Building Regulations 1997 to 2014, from fireplace, chimney or flue and is properly fire sealed.

Directions on the provision and spacing of cavity barriers is given in Tables 3.2 and 3.3 of TGD to Part B of the Building Regulations 1997 to 2014.

2.4.3 Panel Anchorage and Support

For the Knauf Aquapanel ventilated system the framing and sheeting must be adequately strong and rigid to meet the requirements of Part A of the Building Regulations 1997 to 2014. The panels must be fixed to adjacent construction elements such as foundations, rising walls, above

foundations or structural beams or columns. These fixings must be adequate to transmit all panel loads to the adjacent supports and anchors. Anchorage and support are usually provided through a combination of metal straps and anchor bolt systems. The type of anchor used will be dependent on the substrate the anchor is to be fixed to. Typical fixings to adjacent blockwork may be expanding anchor bolts or drive screws or combinations of both to provide appropriate anchor strength without damaging the blockwork. Knauf Aquapanel design programmes identify the required anchorages and fixings and adherence to their specifications is included in the final checklist audit of the construction project. Anchorages and strap ties must be of stainless steel.

3.1 GENERAL DESIGN REQUIREMENTS

For the applications covered by this Certificate, Aquapanel Exterior Cement Board used with other specific and complementary components and to a specific design, forms a satisfactory external wall suitable for use as an exterior wall cladding in timber frame and steel frame houses of up to six storeys in height. It should be installed in accordance with the manufacturer's instructions and as set out in this Certificate.

The design is based on the following:

- The provision of a ventilated and drained cavity to ensure that the timber frame structure is protected from moisture from wind driven rain in the event of unexpected failure of the cladding envelope.
- Effective detailing around window opes to ensure that wind driven rain is excluded from the hidden timbers in the surround and from the cavity.
- The provision of insect guards to all ventilation openings.
- The timber frame structure is protected by an effective vapour barrier on the inside.
- The provision of a horizontal movement joint at every floor to accommodate vertical shrinkage of up to 6mm in the timber frame.
- Subject to maintenance and normal use, a 60 year design life for the cladding system.

The Aquapanel board has to be kept up from ground level by the required minimum of 150mm.

3.2 STRENGTH, STABILITY, RIGIDITY

Aquapanel Exterior Cement Board, as certified in this Certificate for use in the Aquapanel ventilated system, is designed by Knauf Aquapanel on the basis of extensive research, testing and experience in use, to have adequate strength, stability and rigidity to take all likely in-plane and surface loading without loss of serviceability. The panel framing, onto which the Aquapanel Exterior Cement Board is fixed, must be designed in accordance with the relevant Standards and Codes of Practice.

3.3 DESIGN LOADS

Typical designs carried out by Knauf Aquapanel have been examined by NSAI Agrément and comply with the relevant codes of practice. The procedures for the calculation of wind loads should comply with IS EN 1991-1-4:2005+A1:2010 *Eurocode 1 – Actions on structures – General actions – Wind actions* and Diagram 15a of TGD to Part A of the Building Regulations 1997 to 2014.

Dead loads should comply with IS EN 1991-1-1:2002 *Eurocode 1 – Actions on structures – General actions – Densities, self-weight, imposed loads for buildings.* Design snow and wind loads should be based on TGD to Part A of the Building Regulations 1997 to 2014.

	Value / Units
Width (mm)	900
Length (mm)	1200, 2400, 1250, 2500
Thickness (mm)	12.5
Minimum radius for 900mm wide board (m)	3
Minimum radius for 300mm wide strips (m)	1
Weight (kg/m^2)	ca. 16
Dry density (kg/m^2)	ca. 1150
Flexural strength (N/mm^2)	7
E-moduli (N/mm^2)	4000 – 7000
Alkalinity (pH)	12
Thermal conductivity (W/mK)	0.32
Thermal expansion (10^{-6}K)	7
Water diffusion resistance coefficient (μ)	19
Change in dimension from dry to saturated air (%)	0.1
Building Material Class	Non-combustible; A1 acc. DIN 4102

Table 1: Physical Properties

It is recommended that the centres in Table 2 be applied unless specific wind loading calculations are carried out for the cladding on a project.

	Battens @ 600mm centres	Battens @ 400mm centres
Spacing of Aquapanel façade stainless steel screws:		
• Area within 0.2 of wall length from corner	130mm	200mm
• Remainder area of 0.6 of wall length	200mm	200mm

Note:

1. The Aquapanel is supported on a minimum of 3 battens i.e. double span.
2. The minimum edge distance specified by Knauf Aquapanel is 15mm.
3. The screws are Aquapanel façade stainless steel screws 40mm long and 4.0mm shank diameter.
4. The value used for the screws is the rim hole pull through value of 730N and applying a factor value of 3 giving a screw value of 243N.
5. Wind loading checked for a basic wind speed of 26m/s as per Diagram 15A of TGD to Part A of the Building Regulations 1997 to 2007 and BS 6399-2:1997.
6. It is assumed that the building is a maximum of 15m above ground level and the topography is reasonably flat.

Table 2: Aquapanel Support & Fixing Information

3.4 IMPACT RESISTANCE

The Aquapanel Exterior Cement Board is capable of withstanding light impacts by reason of the reinforcement within the board. At ground storey level, precautions must be taken to prevent impact from motor vehicles or other machinery.

The system is considered suitable for category C areas as per Table 2 of BS 8200:1985 *Code of practice for design of non-loadbearing external vertical enclosures of buildings (no longer current but cited in Regulations)*. This category is for walls adjacent to private open gardens and back walls of balconies. These are described as those areas that are readily accessible to the public and others with little incentive to exercise care – chances of accident occurring and misuse. It should be noted that there is a second layer of high impact reinforcement mesh for a height of 1m near ground level. It is recommended that preventative measures such as the provision of a barrier or kerb to prevent cars and other vehicular traffic from bumping and damaging the Aquapanel cladding be put taken.

4.1 BEHAVIOUR IN FIRE

4.1.1 Spread of Flame

It will be necessary to apply a 1m space separation from the boundary as per Table 4.1 of the Technical Guidance Document to Part B of the Building Regulations 1997 to 2014. However, when the Aquapanel mineralic finish is used, the product can be used within 1m of a boundary wall. The Aquapanel board itself and base coat are non-combustible. As an external cladding sheet for panels constructed in accordance with the Aquapanel ventilated external wall panel system, and where it is used on buildings adequately designed in respect of fire safety, the product can meet the relevant requirements of Regulation B4 both in respect of externally exposed wall surfaces and surfaces exposed within concealed cavities. Under these conditions the board may be used as an external cladding on buildings of all purpose groups with cavity barriers and fire stops and indicated in cl. 2.1 and 3.3 of TGD to Part B of the Building Regulations 1997 to 2014.

4.1.2 Fire Resistance

The Aquapanel Exterior Cement Board is non-combustible and has a spread of flame rating equivalent to Class 0, the system complies with cl. 4.1.5 and Table 4.1 of TGD to Part B of the Building Regulations 1997 to 2007.

4.1.3 Protection of Buildings from Heat Producing Appliances

Where it is planned to construct an external wall panel near a chimney, fireplace, or other heat producing appliance, using Aquapanel Exterior Cement Boards fixed to stud framework, the building must be protected from fire. Combustible materials, e.g. insulation, should be separated from the flue of a masonry chimney by at least 200mm, or at least 40mm from the outer surface of the chimney. Particular details are given in Section 2 and diagrams 2 to 6 of the TGD to Part J of the Building Regulations 1997 to 2014. The separation from a heating appliance to combustible wall insulation material should be as set out in cl. 2.2 and diagram 8 of the TGD to Part J of the Building Regulations 1997 to 2014. For chimneys covered by IS EN 1856-1:2009 *Chimneys – Requirements for metal chimneys – System chimney products* separation between combustible materials and the external surface of the chimney should be determined in accordance with cl. 2.17 of the TGD to Part K of the Building Regulations 1997 to 2014. Combustible material in proximity to a constructional hearth must be protected by 250mm of solid concrete or as detailed in diagram 4 of the TGD to Part J of the Building Regulations 1997 to 2007.

Aquapanel Exterior Cement Boards should be separated by a minimum air space of 75mm or by a shield of 25mm non combustible material from an oil, solid fuel or gas heating appliance as indicated in Section 2 diagram 9 of the TGD to Part J of the Building Regulations 1997 to 2014.

4.2 THERMAL INSULATION & CONDENSATION RISK

While the Aquapanel Exterior Cement Boards will contribute to the thermal resistance of walls and to the reduction of surface condensation risks, the major contributions to this come from the insulating materials, the internal cavities within the wall panel and the water/vapour control membranes. Calculation of U values must be completed in accordance with the TGD to Part L of the Building Regulations 1997 to 2014.

The risk of interstitial and surface condensation should be examined at wall design stage and appropriate insulation details and vapour resistant membranes can be installed during construction to minimise these risks. The higher levels of insulation around all openings in the external walls also lessens the risks of local condensation problems and excessive heat losses. It is essential to insulate any pipework passing through or within the concealed space behind the boards. Care must be taken when installing DPCs, particularly under windows, to ensure that any condensation occurring on the window is drained away and outwards from the cavity. Reference should be made to BS 5250:2011 *Code of practice for control of condensation in buildings*, to minimise the risk of condensation within the building elements and the structure.

4.3 SOUND INSULATION

The Aquapanel ventilated system as covered by this Certificate is for external wall construction for which there is no specific requirement in respect of sound insulation performance.

However where the maintenance of a high quality environment requires it, the acoustic performance of walls based on the Aquapanel ventilated system can be assessed by calculation or by examination of the results of field tests carried out on some typical wall specifications. For best acoustic insulation an examination of the key junctions in this form of construction can be undertaken along conventional principles, e.g. those shown in TGD to Part E of the Building

Regulations 1997 to 2014. The system design can be readily adapted to generate wall specifications along the best acoustic principles covered in BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings.*

It is recommended that each timber frame and steel frame manufacturer planning to use the Aquapanel cladding system, determine sound insulation values for the external wall and make them available to the Architect/Engineer for each housing development.

4.4 ELECTRICAL SAFETY

As is a requirement for all situations where electrical cables carrying current pass through highly insulated walls, de-rating of the electric cables should be allowed for where insulation restricts the air cooling of the cables. This should be done in accordance with the *National Rules for Electrical Installations (ETCI)* Document No. ET 101.

4.5 INFESTATION

The use of Aquapanel Exterior Cement Board and ancillary products does not promote infestation, as there is no food value in the materials used.

4.6 WEATHERTIGHTNESS AND DAMP-PROOFING

The Aquapanel ventilated system as designed by Knauf Aquapanel for use in Ireland has adequate damp-proof courses, water/driving rain resistant membranes and articulate building details to resist the passage of moisture from the ground or from weather. For Irish house building applications the system has a 38mm ventilated and drained vertical cavity behind the Aquapanel Exterior Cement Board and the ensurance of satisfactory water management outwards through the system under driving rain conditions. This self draining cavity is further protected against water ingress by a continuous NSAI Agrément approved vapour permeable membrane back-lining. This cavity is vented to ensure it stays dry and DPCs are installed to provide outward drainage. To ensure that the construction specification is fully and accurately achieved on site only Greenspan trained and registered installers will carry out installation of the system, undertake inspections prior to installation and as the work is progressed, audit the completion of the designed action checklist on each site project with a representative of Greenspan, verify that a warranty of the installation of Knauf Aquapanel is in place and maintain appropriate records of each installation.

4.7 MAINTENANCE

In line with most external wall panel building systems periodic inspection should be undertaken to assess the need or otherwise for cleaning, maintenance painting, localised repairs, and element replacements such as joint seals and fixings. Also, the retained status from original installation specification of cladding and textured finishes should be assessed. The external surface coating is likely to require re-coating with a Knauf Aquapanel approved unaggregated synthetic resin coating after approximately twenty years, to maintain the appearance. Knauf Aquapanel and Greenspan have a maintenance procedure and for remedial or maintenance work a suitable unaggregated polymer finish coating is available for application over existing external finishes. Particular maintenance actions should be taken where a building is in a marine or other aggressive environment (see also Part 3 of this Certificate).

4.8 DURABILITY

When installed in accordance with the manufacturer's instructions and this Certificate any timber elements or insulation are adequately protected by the external cladding of Aquapanel Exterior Cement Board and the inner water resisting membranes and DPCs and will have a life equivalent to that expected for the facing board, i.e. a design life of sixty years without major maintenance. With the modifications implemented to protect the system from damage from driving rain and weather ingress, and the increased control of installation, walls should achieve a design life of sixty years without major maintenance. Under normal conditions of occupancy the various components of the system are unlikely to suffer impact damage, but if damage does occur repairs are easily carried out.

4.9 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING

(a) Bending stiffness
(b) Dimensional stability
(c) Impact strength
(d) Shear strength and tensile strength of fixings
(e) Flexural strength
(f) Indentation strength
(g) Uniform loading capacity between studs
(h) Water absorption
(i) Nail pull-through resistance
(j) Nailability of board
(k) Weight per m^2
(l) Freeze thaw resistance
(m) Surface spread of flame
(n) Thermal conductivity
(o) Minimum bending radius
(p) Suitability for surface coatings

4.10 OTHER INVESTIGATIONS

(i) Existing data on properties in relation to fire, toxicity, and the contribution of the product to structural stability and durability were assessed.
(ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the

quality, composition and consistency of the materials used.

(iii) Site visits were conducted to assess the practicability of installation and the history of performance of the product.

(iv) An independent engineering survey report on the weathering and durability of a sample of existing buildings up to ten years old was studied and collated, in the context of a sixty year design life concept.

(v) The Knauf Aquapanel/Greenspan installation quality control system was assessed.

5.1 National Standards Authority of Ireland ("NSAI") following consultation with NSAI Agrément has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of issue so long as:

(a) the specification of the product is unchanged.

(b) the Building Regulations 1997 to 2014 and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.

(c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.

(d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.

(e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.

(f) the registration and/or surveillance fees due to NSAI are paid.

5.2 The NSAI Agrément mark and certification number may only be used on or in relation to product/processes in respect of which a valid Certificate exists. If the Certificate becomes invalid the Certificate holder must not use the NSAI Agrément mark and certification number and must remove them from the products already marked.

5.3 In granting Certification, the NSAI makes no representation as to;

(a) the absence or presence of patent rights subsisting in the product/process; or

(b) the legal right of the Certificate holder to market, install or maintain the product/process; or

(c) whether individual products have been manufactured or installed by the Certificate holder in accordance with the descriptions and specifications set out in this Certificate.

5.4 This Certificate does not comprise installation instructions and does not replace the manufacturer's directions or any professional or trade advice relating to use and installation which may be appropriate.

5.5 Any recommendations contained in this Certificate relating to the safe use of the certified product/process are preconditions to the validity of the Certificate. However the NSAI does not certify that the manufacture or installation of the certified product or process in accordance with the descriptions and specifications set out in this Certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act 2005, or of any other current or future common law duty of care owed by the manufacturer or by the Certificate holder.

5.6 The NSAI is not responsible to any person or body for loss or damage including personal injury arising as a direct or indirect result of the use of this product or process.

5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certification.

NSAI Agrément

This Certificate No. **06/0161** is accordingly granted by the NSAI to **Greenspan System Sales Ireland Ltd.** on behalf of NSAI Agrément.
Date of Issue: **August 2002**

Signed

Seán Balfe
Director of the Irish Agrément Board
Readers may check that the status of this Certificate has not changed by contacting NSAI Agrément , NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. www.nsai.ie

Revisions: February 2006, April 2007, November 2008, January 2014, September 2016

- Application of use extended to exterior wall cladding in timber frame and steel frame houses of up to two storeys in height.
- Application of use extended to timber frame and steel frame houses and apartments of up to six storeys in height.
- Inclusion of use of Monocouche and sand and cement render.
- Change of company name.
- Reference to Building Regulations and standards updated.

Certificate 06/0161 Detail Sheet 1: Aquapanel – Timber Frame Application

PRODUCT DESCRIPTION
This Detail Sheet relates to the use of Aquapanel Exterior Cement Board System, comprised of aggregated Portland Cement board reinforced with polymer-coated glass fibre mesh, as an exterior wall cladding in timber frame houses of up to two storeys in height – this includes detached, semi-detached and terraced houses.

This Detail Sheet must be read in conjunction with NSAI Agrément Certificate 06/0161, which gives the product's position regarding Building Regulations, general information relating to the Aquapanel Exterior Cement Board System, and the Conditions of Certification.

Part One / Technical Specification and Control Data 1

GENERAL PROCEDURE & DETAILS
External wall panels should be fabricated and constructed in accordance with the Knauf Aquapanel ventilated system for use in Ireland and building details should conform with those set out in the *"Greenspan Products Architectural Details Manual".*

The system is designed for installation on the external walls in new and existing buildings. The Aquapanel Exterior Cement Boards are fixed to vertical vacuum or pressure treated 38mm x 75mm (minimum thickness) timber battens at not more than 600mm maximum centres, with Aquapanel stainless steel screws. Battens will be fixed through a breathable membrane or equivalent grade plywood – battens will be fixed to correspond in line with the vertical timber stud frame members. Stud frame construction, including plywood sheet fixing and internal plasterboard slab or vapour barrier, will be along traditional methods with stud sizes of 90mm x 44mm or greater.

Horizontal movement joints must be provided at every floor to accommodate vertical shrinkage of up to 6mm in the timber frame.

The thickness and 'λ' value of the insulation to be provided to meet Part L of the Building Regulations 1997 to 2014 will be determined at the design stage. In general, all installation should be in accordance with good practice and the manufacturer's instructions. All installations require careful planning and setting out.

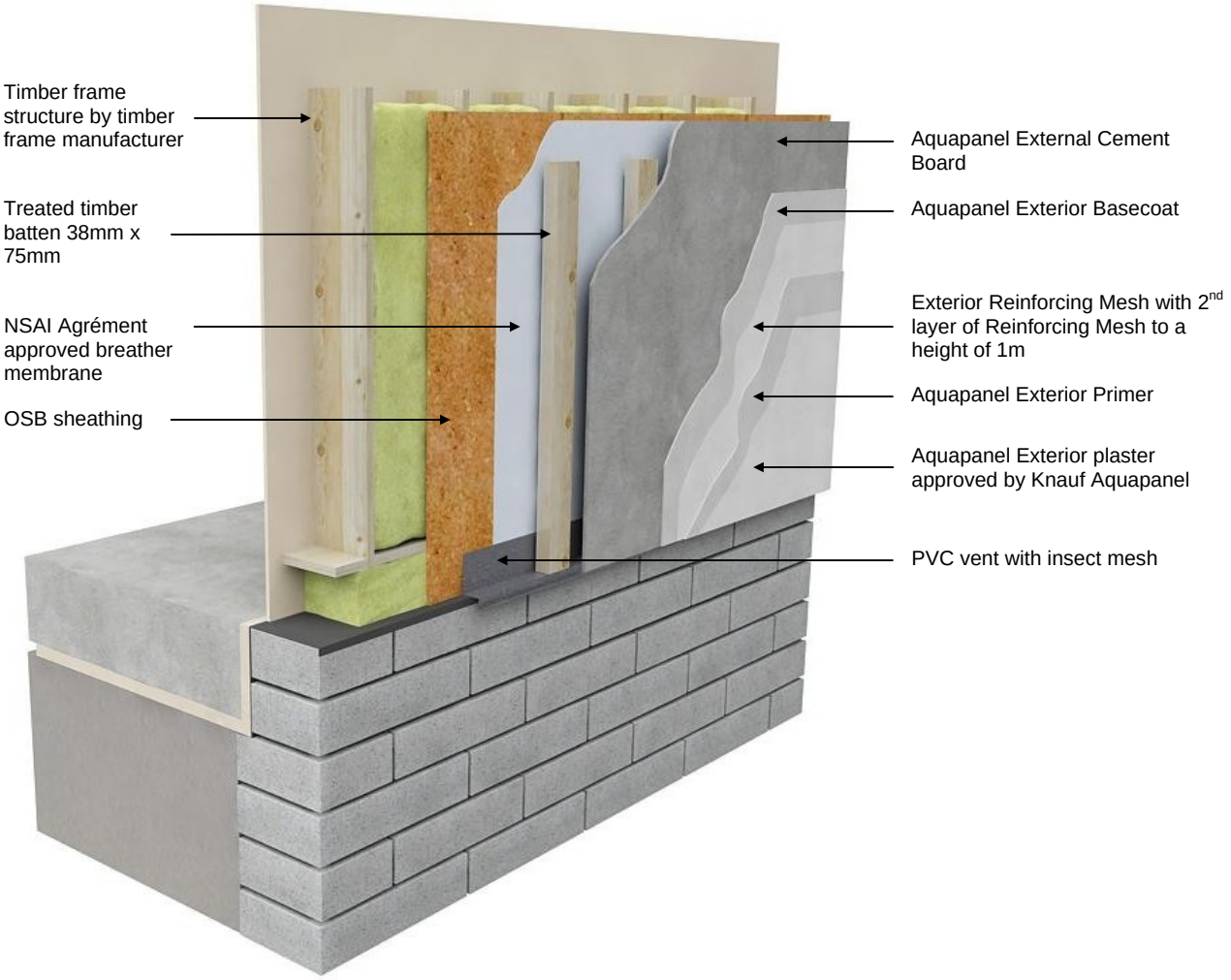

Figure 1: Foundation detail

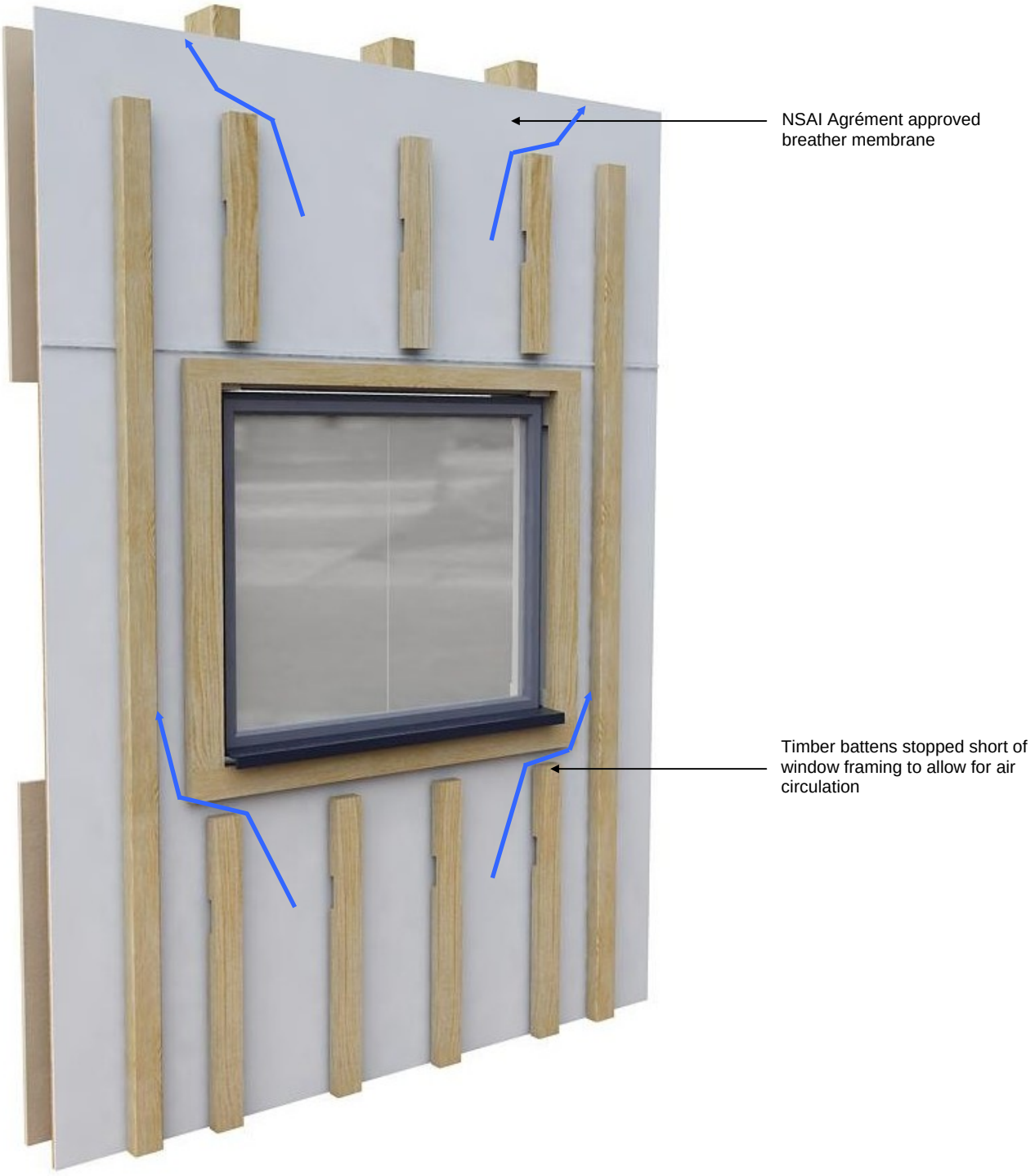

Figure 2: Window cill and head detail

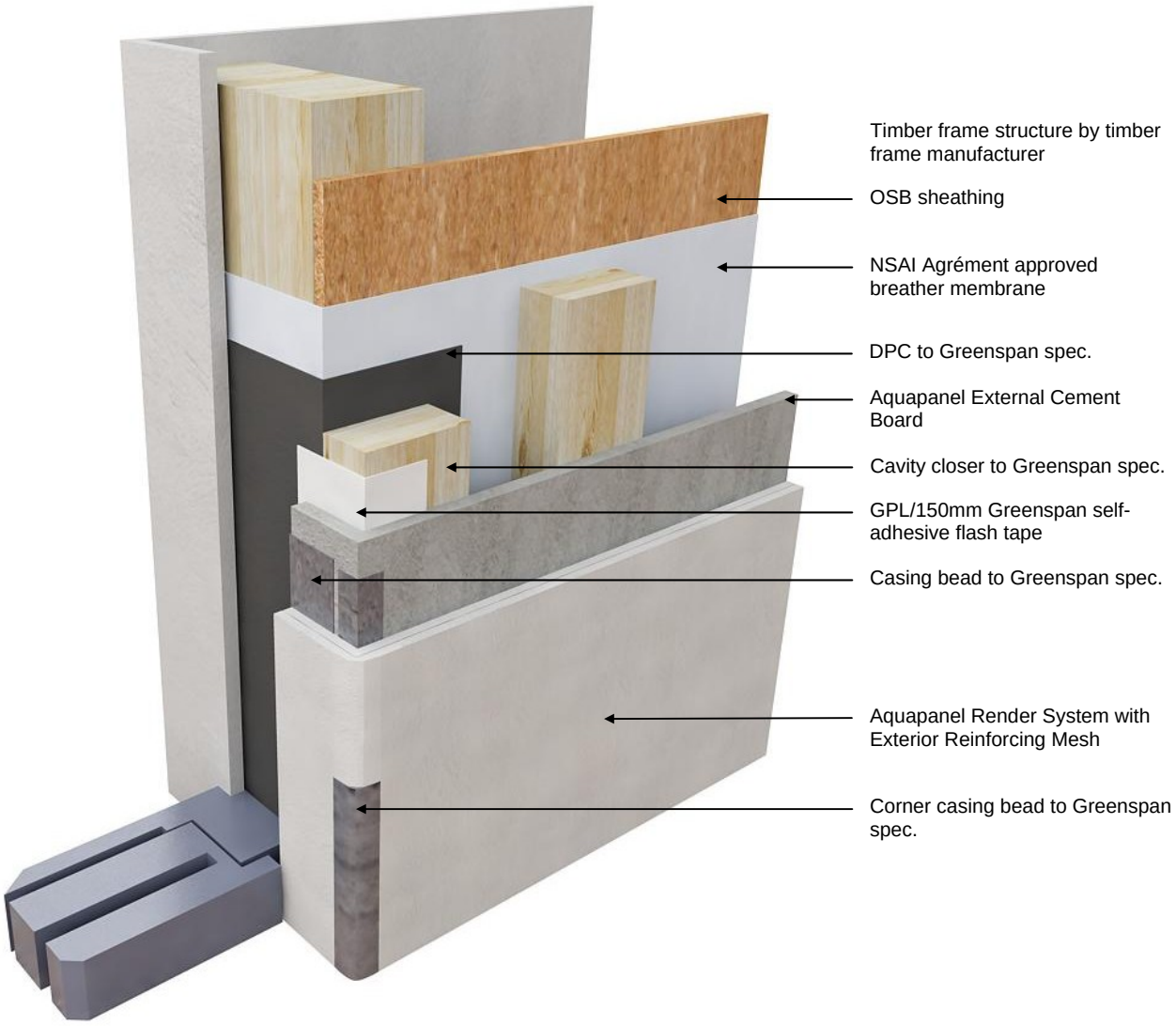

Figure 3: Window jamb detail

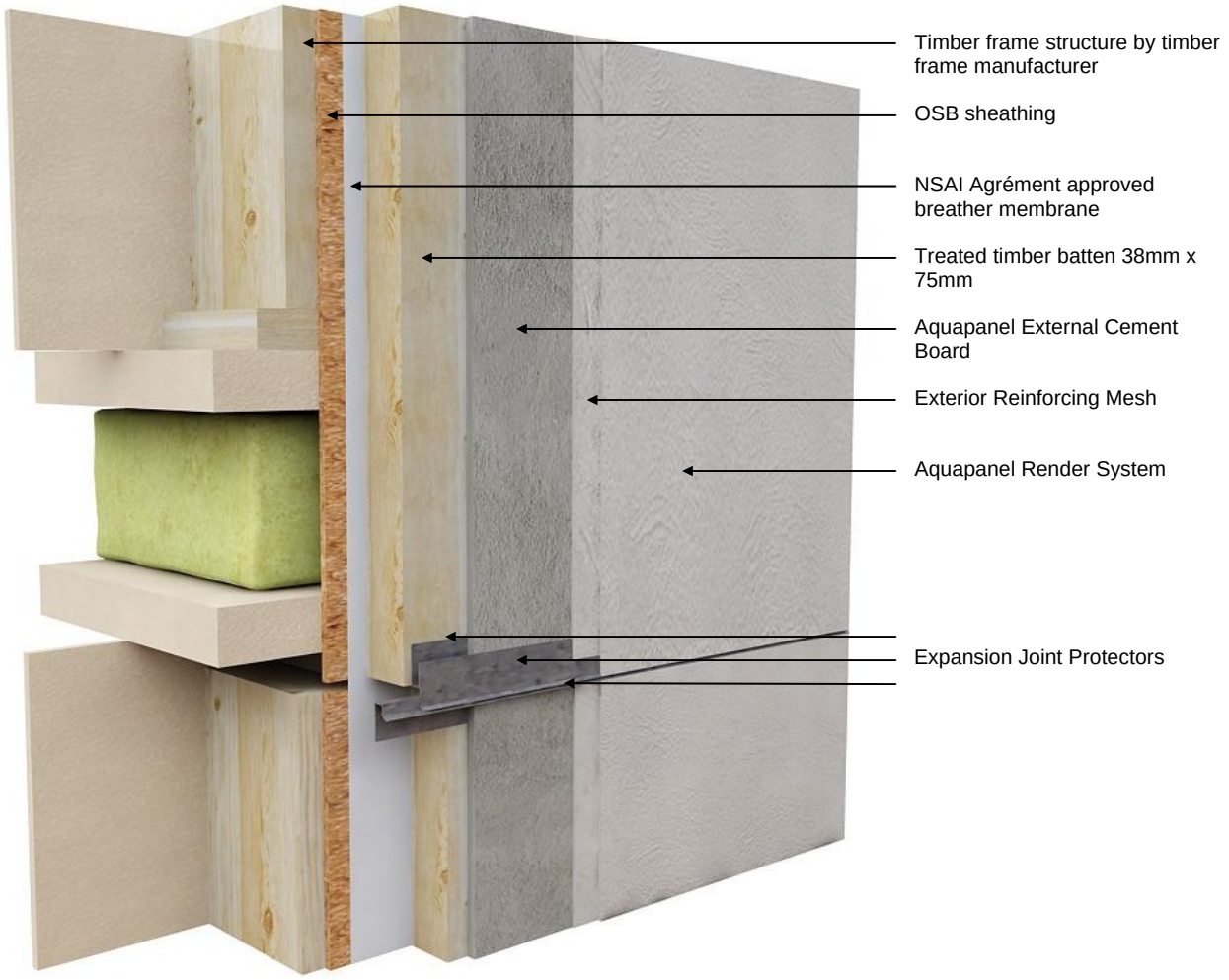

Figure 4: Horizontal expansion joint detail

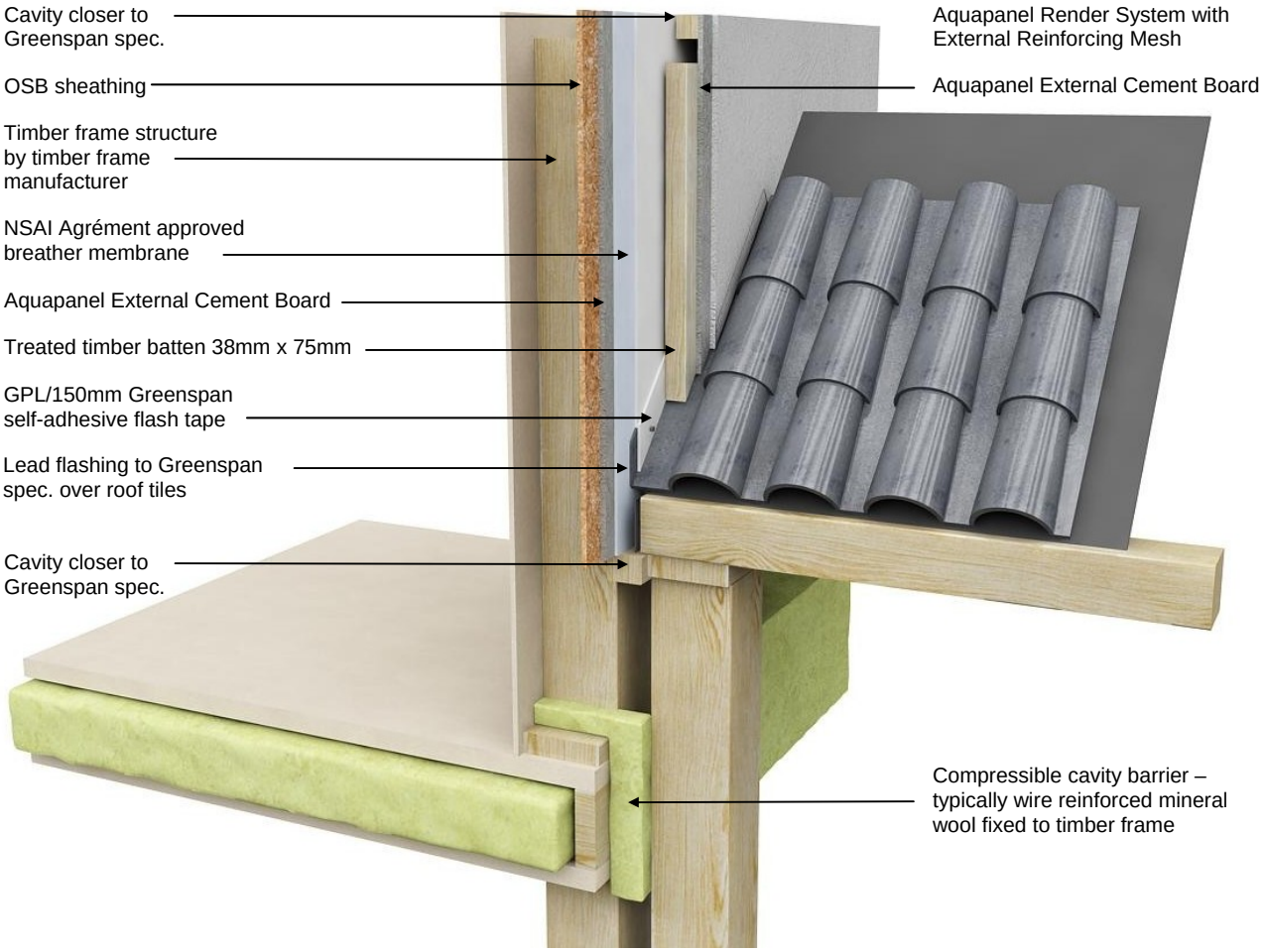

Figure 5: Stepped roof detail

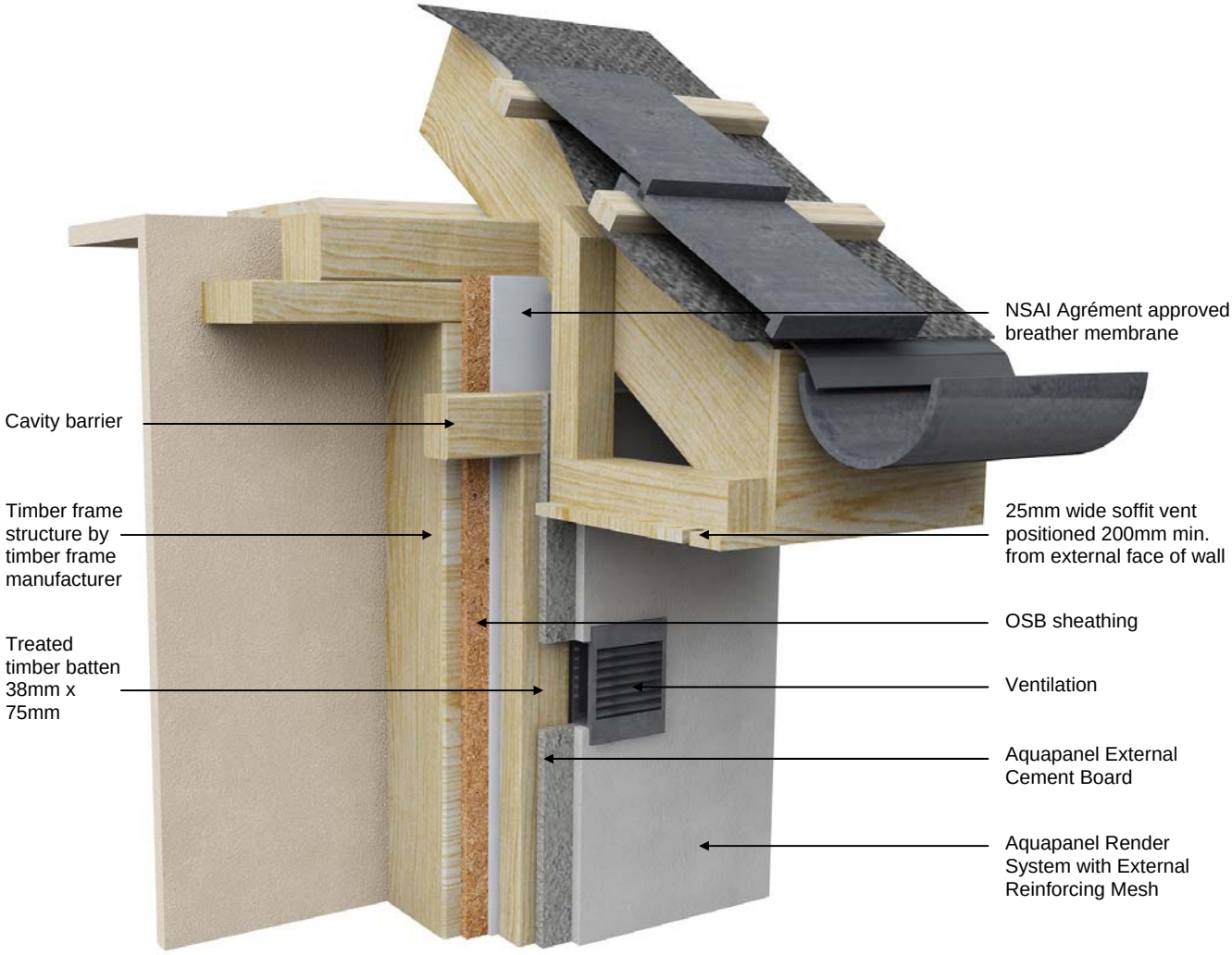

Figure 6: Eaves detail

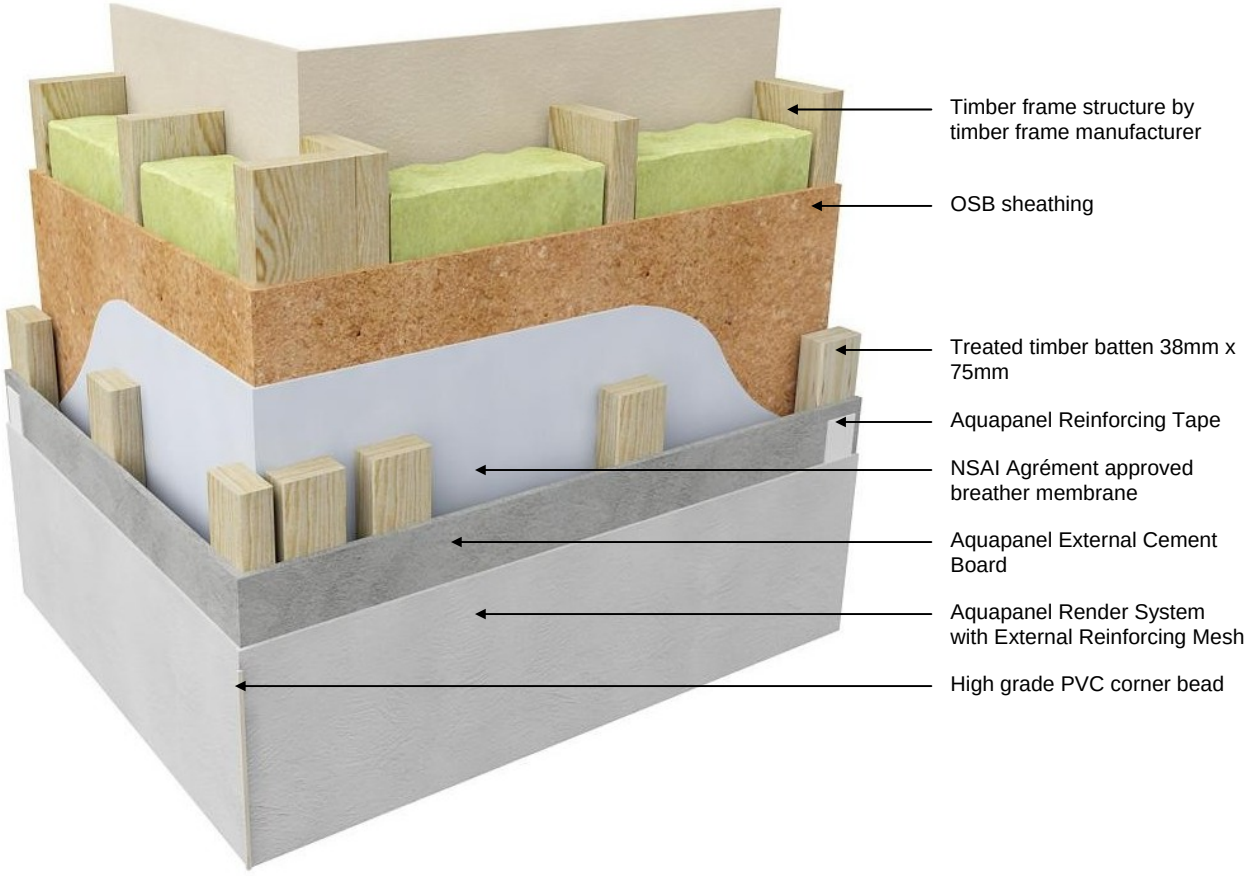

Figure 7: Corner detail

Figure 8: Window cill detail

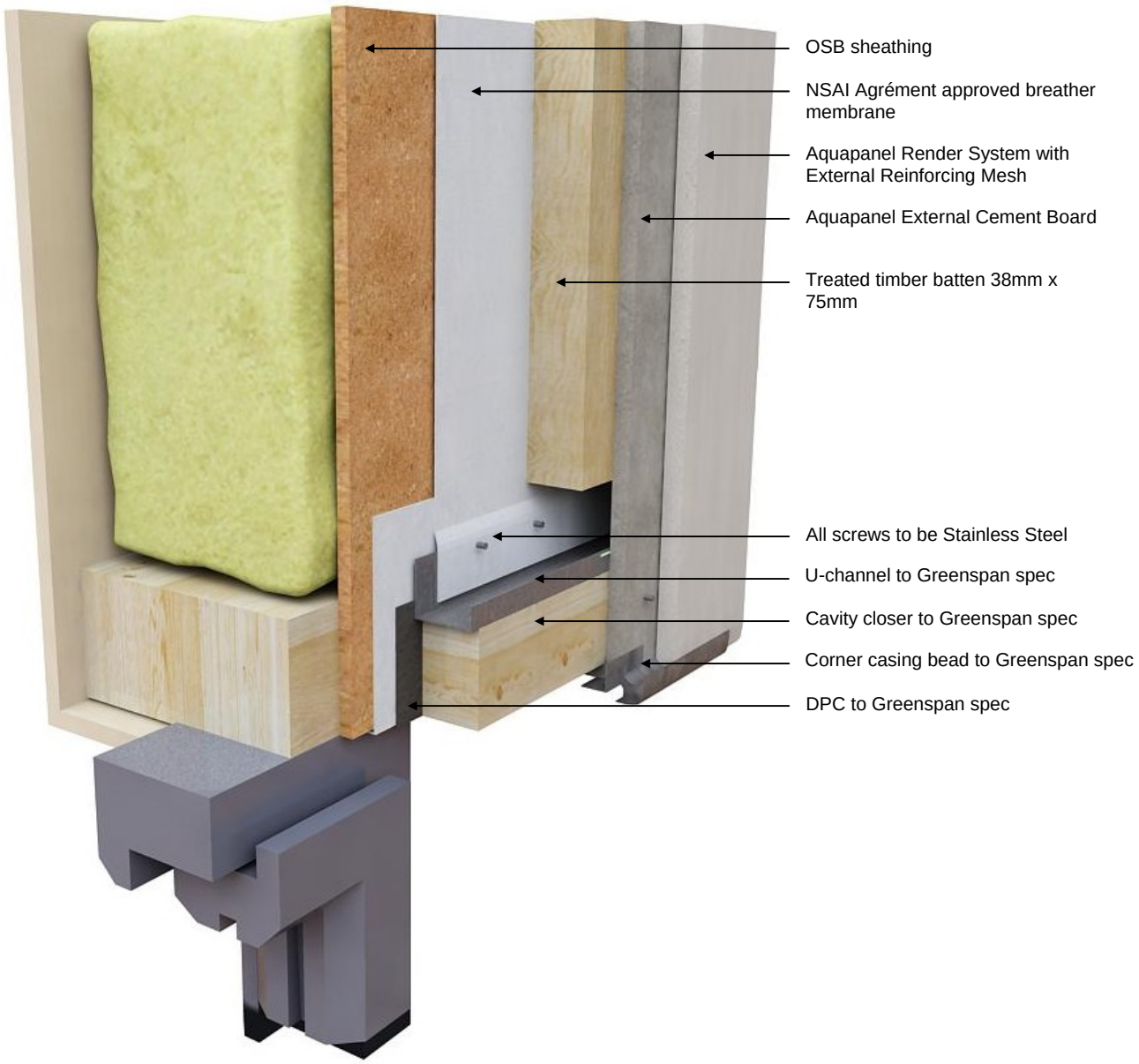

Figure 9: Window head detail

NSAI Agrément

Certificate 06/0161 Detail Sheet 2: Aquapanel – Steel Frame Application

PRODUCT DESCRIPTION
This Detail Sheet relates to the use of Aquapanel Exterior Cement Board System, comprised of aggregated Portland Cement board reinforced with polymer-coated glass fibre mesh, as an exterior wall cladding in steel frame houses of up to two storeys in height – this includes detached, semi-detached and terraced houses.

This Detail Sheet must be read in conjunction with NSAI Agrément Certificate 06/0161, which gives the product's position regarding Building Regulations, general information relating to the Aquapanel Exterior Cement Board System, and the Conditions of Certification.

Part One / Technical Specification and Control Data 1

SYSTEMS & FIXINGS FOR STEEL FRAME CONSTRUCTION
In addition to timber frame construction, the Aquapanel ventilated system for use in Ireland can be based on cold-formed light gauge steel frame construction, hot rolled steel construction and appropriate durability protection.

For cold-formed light gauge steel framed construction, fixings and installations will be along similar lines to those for timber framed construction except that the stainless steel fixing screws will require to be self-tapping or other appropriate self-tapping drive screw. Cold-formed steel frame elements should be of material thickness 14 to 20 gauge and as specified by Knauf Aquapanel.

Horizontal movement joints are not required for steel frame construction – this can be verified by a chartered structural engineer.

The recommendations of Greenspan and Knauf Aquapanel should be followed for all fixing requirements. All boards are fixed using stainless steel fixing screws of an approved type and dimensions, and only as specified by Knauf Aquapanel.

In order to avoid thermal bridging, vertical timber battens 38mm x 75mm are proposed to be fitted opposite steel studding at maximum of 0.6m centres.

Certificate 06/0161 Detail Sheet 3: Aquapanel – Use up to Six Storeys

PRODUCT DESCRIPTION
This Detail Sheet relates to the use of Aquapanel Exterior Cement Board System, comprised of aggregated Portland Cement board reinforced with polymer-coated glass fibre mesh, as an exterior wall cladding in timber frame and steel frame houses and apartments of up to six storeys in height and penthouse – this includes detached, semi-detached and terraced houses.

For buildings that exceed two storeys in height, either the Aquapanel mineralic finish must be used. For further information on these finishes, contact Greenspan Technical Department.

This Detail Sheet must be read in conjunction with NSAI Agrément Certificate 06/0161, which gives the product's position regarding Building Regulations, general information relating to the Aquapanel Exterior Cement Board System, and the Conditions of Certification.

Part One / Technical Specification and Control Data 1

	Aquapanel Screws	Aquapanel Nails	Aquapanel Staples
Battens @ 400mm centres	200mm c/c for internal support batten 200mm c/c for edge support batten	95mm c/c for internal support batten 200mm c/c for edge support batten	65mm c/c for internal support batten 180mm c/c for edge support batten
Battens @ 600mm centres - **Area within 0.2 of wall length from corner battens @ 600 c/c** - **Remainder area of 0.6 of wall length**	Not allowed 180mm c/c for internal support batten but 120mm for space between first and second screw 200mm c/c for edge support batten	Not allowed 55mm c/c for internal support batten 180mm c/c for edge support batten	Not allowed 35mm c/c for internal support batten 120mm c/c for edge support batten

Note:
1. The Aquapanel is supported on a minimum of 3 battens i.e. double span
2. The minimum edge distance specified by Knauf Aquapanel is 15mm
3. Wind loading checked for a basic wind speed of 26m/s as per Diagram 15A of TGD to Part A of the Building Regulations 1997 to 2014 and IS EN 1991-1-4:2005+A1:2010
4. A maximum overriding fixing spacing of 200mm is taken for the Aquapanel
5. All fixings are stainless steel
6. The screws are Aquapanel façade stainless steel screws (40mm long and 3.05mm shank diameter)
7. The nails are Haubold nailscrew RNC-S 28/45 NS TX 15 RF (2.8mm x 45mm)
8. The staples are Haubold SD 91050 CRF

Table 1: Aquapanel Support and Fixing

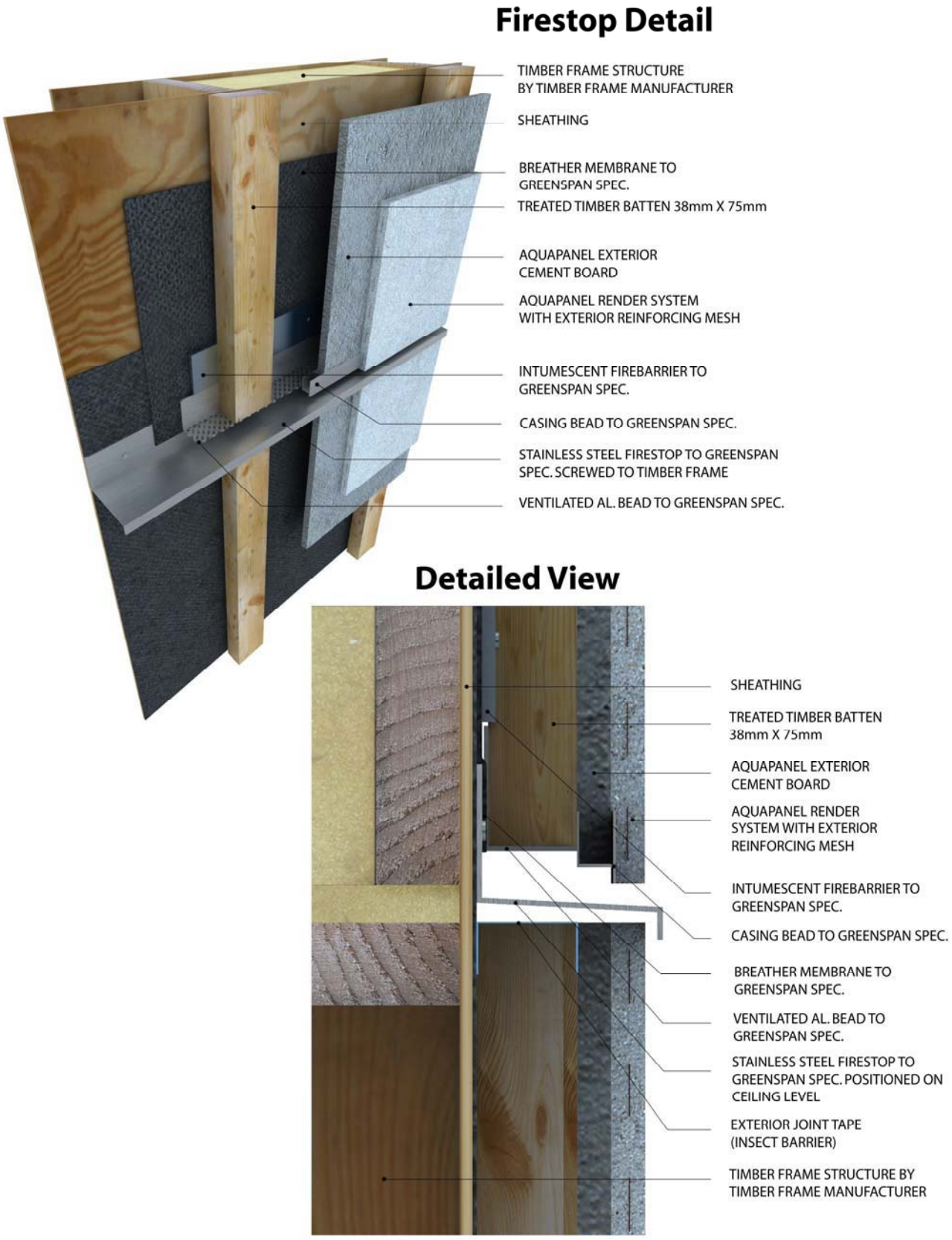

Figure 1: Firestop detail