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Agrément Certificate

10/4725

Product Sheet 1

LAFARGE GTEC AQUABOARD SYSTEMS

LAFARGE GTEC AQUABOARD DIRECT RENDER SYSTEM

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Lafarge GTEC Aquaboard Direct Render System. The system consists of Parex Render System applied on Lafarge GTEC Aquaboard, for use as an exterior wall façade panel system in timber-frame and steel-frame buildings.

AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Strength and stability — the system can accept surface loadings likely to be met in the UK (see section 5)

Performance in relation to fire — Aquaboard has a reaction-to-fire classification of A2-s1, d0 and has a spread-of-fire rating equivalent to Class 0 as defined in the national Building Regulations (see section 7).

Weathertightness — the system resists the passage of moisture from the ground and from weather (see section 9).

Water absorption — Aquaboard has a water absorption Class H1 and, therefore, provides a significant resistance to water absorption (see section 10).

Durability — the system has acceptable durability and can be expected to have a service life in excess of 30 years (see section 14).

The BBA has awarded this Agrément Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 19 February 2010

Brian Chamberlain

Head of Approvals — Engineering

Greg Cooper

Chief Executive

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Regulations

In the opinion of the BBA, Lafarge GTEC Aquaboard Direct Render System, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	A1	Loading
Comment:		The system is acceptable for use as set out in sections 5.1 to 5.10 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The system meets Class 0 requirement. See sections 7.1 to 7.4 of this Certificate.
Requirement:	C2(b)(c)	Resistance to moisture
Comment:		The system will meet this requirement. See sections 9.1, 9.2, 11.1 to 11.5 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The system is acceptable. See sections 14.1 and 14.2 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The system can contribute to a construction satisfying this Regulation. See sections 13.1, 13.2, 13.3, 14.1 and 14.2 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards — construction
Standard:	1.1(a)(b)	Structure
Comment:		The system is acceptable, with reference to clause 1.1.1 ⁽¹⁾⁽²⁾ . See sections 5.1 to 5.10 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The system can contribute to satisfying this Standard, with reference to clause 2.6.4 ⁽¹⁾⁽²⁾ . See sections 7.1 to 7.4 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The system can contribute to satisfying this Standard, with reference to clause 2.7.1 ⁽¹⁾⁽²⁾ . See sections 7.1 to 7.4 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The system will contribute to meeting this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ to 3.10.3 ⁽¹⁾⁽²⁾ , and 3.10.5 ⁽¹⁾⁽²⁾ to 3.10.6 ⁽¹⁾⁽²⁾ . See sections 9.1 and 9.2 of this Certificate.
Standard:	3.15	Condensation
Comment:		The system can satisfy or contribute to satisfying this Standard, with reference to clauses 3.15.1 ⁽¹⁾ , 3.15.2 ⁽¹⁾ , 3.15.4 ⁽¹⁾ and 3.15.5 ⁽¹⁾ . See sections 9.1, 9.2 and 11.1 to 11.5 of this Certificate.
Regulation:	12	Building standards — conversions
Comment:		All comments given for this system under Regulation 9, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ , such standards to be applied as defined by Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		This system is acceptable. See sections 14.1 to 14.2 and the <i>Installation</i> part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The system is acceptable. See sections 13.1 to 13.3 of this Certificate.
Regulation:	C4(b)	Resistance to ground moisture and weather
Comment:		The system will contribute to meeting this Regulation. See sections 9.1 and 9.2 of this Certificate.
Regulation:	C5	Condensation
Comment:		The system is acceptable. See sections 9.1, 9.2 and 11.1 to 11.5 of this Certificate.
Regulation:	D1	Stability
Comment:		The system is acceptable as set out in section 5.1 to 5.10 of this Certificate.
Regulation:	E5(a)	External fire spread
Comment:		The system meets the Class 0 requirements. See sections 7.1 to 7.4 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See section: 2 *Delivery and site handling* (2.1 to 2.4)

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of Lafarge GTEC Aquaboard Direct Render System, when installed and used in accordance with this Certificate, satisfy the requirements in relation to *NHBC Standards*, Chapter 6.2 *External timber framed walls*, Chapter 6.3 *Internal walls*, Chapter 6.9 *Curtain walling and cladding* and Chapter 8.2 *Wall and ceiling finishes*.

General

This Certificate relates to Lafarge GTEC Aquaboard Direct Render System, for use as an external wall façade panel system in conjunction with timber-frame or steel-frame buildings incorporating battens to create a cavity.

The Parex Render System for the GTEC Aquaboard Direct Render System is manufactured and supplied by Parex Ltd, Holly Lane Industrial Estate, Atherstone, Warwickshire CV9 2QZ. Tel: 01827 711755, Fax: 01827 711330, website: www.parex.co.uk

Technical Specification

1 Description

1.1 The Lafarge GTEC Aquaboard Direct Render System consists of GTEC Aquaboard, a gypsum core, coated with Parex Pariso Render System (see Figures 1 and 2).

Figure 1 Typical details — steel-frame

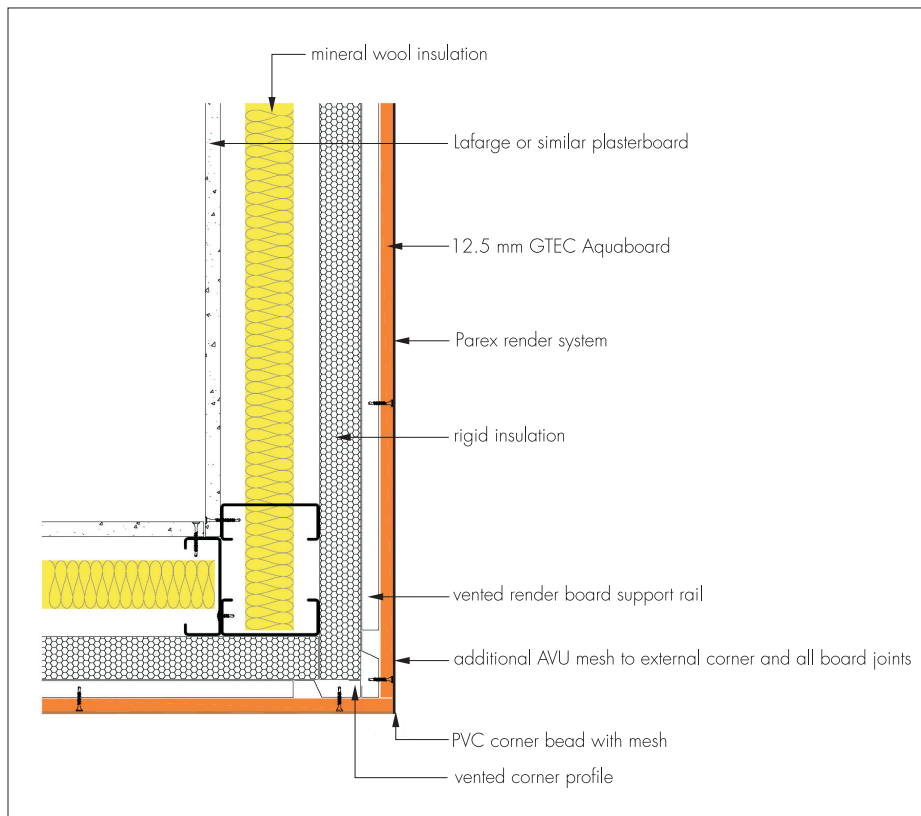
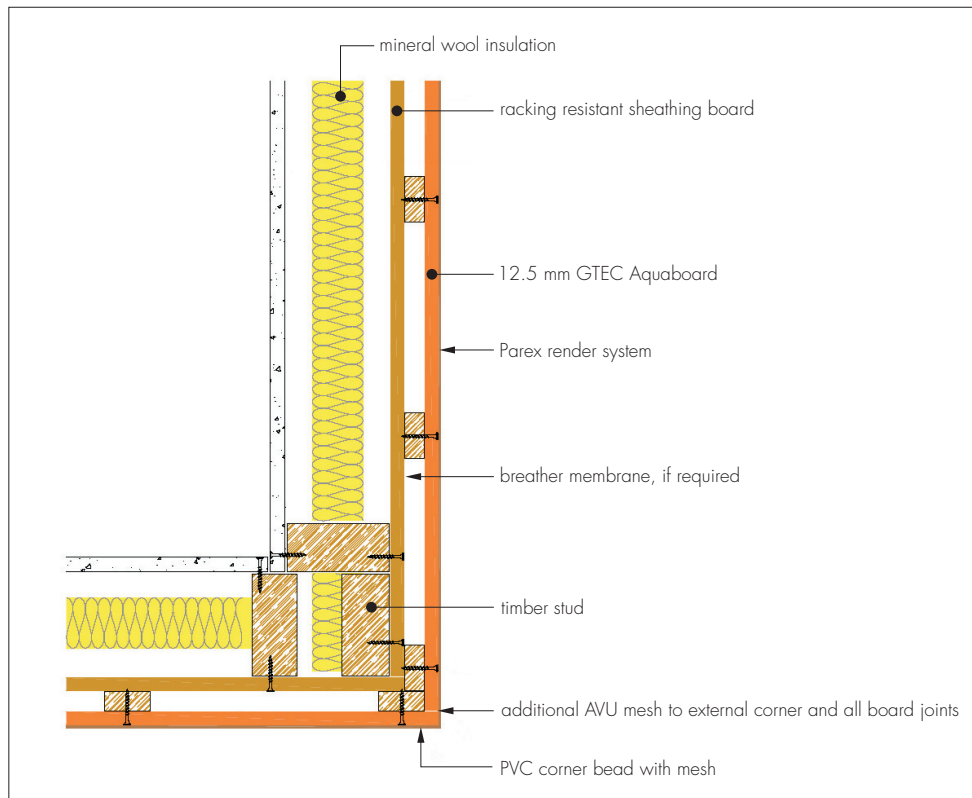


Figure 2 Typical details — timber-frame



1.2 The GTEC Aquaboard is an orange-coloured, tapered-edge gypsum board manufactured to BS EN 15283-1 : 2008 and has been formulated to offer a water- and mould-resistant performance.

1.3 The boards are available with nominal characteristics of:

Width (mm)	1200
Length (mm)	2400, 2700, 3000
Thickness (mm)	12.5, 15
Weight ($\text{kg}\cdot\text{m}^{-2}$)	10.8 (for 12.5 mm) and 12.5 (for 15 mm)
Density ($\text{kg}\cdot\text{m}^{-3}$)	860
Flexural modulus ($\text{N}\cdot\text{mm}^{-2}$)	4000 — longitudinal direction (dry conditions) 3000 — transverse direction (dry conditions)

1.4 The Parex Render System comprises:

- Parex 121/Maite Monocomposant — a basecoat and joint filler of polymer-modified, coloured mortar in powder form ready to mix with water
- Parex 355 AVU — glassfibre polymer-coated, alkaline-resistant mesh to BS EN ISO13934-1 : 1999
- Parex DPR/Revlane topcoat finish — pre-mixed, ready-to-apply acrylic-based decorative coatings for external and internal walls
- Parex 365 Water Master — flashing membrane tape around door and window openings and openings within the board
- Parex direct render profiles — a range of standard profiles at the wall base, end stops, reveal and corner mesh, expansion joints for vertical and horizontal applications; sill extensions and fire-break systems available in a range of materials to suit the project requirements. These are available in stainless steel to BS EN 10088-1 : 1995, galvanized steel to BS EN 10327 : 2004 both of which can be powder coated to BS 6497 : 1984. All profiles to be approved by the Certificate holder.

1.5 The ventilated cavity can be created by timber battens or vented render-board support rails. These are outside the scope of this Certificate.

1.6 The steel frame should be of metal gauges ranging from 1.0 mm to 1.6 mm to suit specific load conditions, and in accordance with BS EN 10140 : 2006. The frame is outside the scope of this Certificate.

1.7 Fixings used are:

- GTEC Aqua self-drilling screws — for metal battens more than 0.7 mm gauge
- Aqua self-tapping screws — for light steel gauges less than or equal to 0.7 mm
- GTEC Aqua high-thread screws — for use with timber supports.

1.8 Quality control is carried out on raw materials and finished products. Quality control checks on the finished boards include:

- dimensions
- density
- flexural strength
- impact
- water absorption
- peeling.

2 Delivery and site handling

2.1 Boards are stacked on timber pallets. Each pack contains a label incorporating the manufacturer's name, product name, edge type, thickness, width, length, number of boards per pallet, pallet weight, recommended storage, handling method, appropriate classification to BS EN 15283-1 : 2008 and the CE Marking.

2.2 Boards must be stored flat on a dry, level surface protected from contamination. Stacks should not exceed seven pallets high. The Certificate holder's instructions on site handling and storage must be followed.

2.3 The render bags are supplied stacked on pallets of 40 bags and the acrylic finishes in sealed buckets. Rolls of mesh are delivered in cardboard boxes stacked vertically on pallets. Each bag/bucket/mesh incorporates the manufacturer's name, product name, weight, batch reference, date of manufacture and application instructions. The Certificate holder's instructions on site handling and storage must be followed.

2.4 The render materials should be stored in a cool dry place and protected from moisture, frost and direct sunlight. Metal components and render beads must be stored flat in dry conditions. Details of packaging and weight for the components of the system are given in Tables 1 and 2.

Table 1 Packaging and weights — Render components

Render component	Dimension/quantity	Weight (kg)	Packaging
Maite Monocomposant – Basecoat, joint filler and adhesive	–	30	Bags – 40 per pallet 1.2 tonnes per pallet
DPR/Revlane – Topcoat	–	25 and 29.5	Buckets – 36 per pallet
365 Water Master Flashing Tape	75 mm/150 mm/300 mm x 30.5 m	2.5/5/10	Individual rolls
355 AVU Glassfibre Reinforcement Mesh	50 m x 1 m	7	Individual rolls
Parex Render Profiles	2.5 – 3.0 m long	various	boxed

Table 2 Packaging and weights — Boards and fixings

Panel/fixing	Lafarge code	Product size (mm)	Packaging number/weight
12.5 mm GTEC Aquaboard	AQUA G2	1200 x 2400	52 boards per pallet, 1.65 tonnes per pallet
12.5 mm GTEC Aquaboard	AQUA G3	1200 x 2700	52 boards per pallet, 1.83 tonnes per pallet
12.5 mm GTEC Aquaboard	AQUA G1	850 x 1200	52 boards per pallet, 0.63 tonnes per pallet
12.5 mm GTEC Aquaboard	AQUA G2H	1200 x 2400	26 boards per pallet, 0.72 tonnes per pallet
12.5 mm GTEC Aquaboard	AQUA G3H	1200 x 2700	26 boards per pallet, 0.92 tonnes per pallet
12.5 mm GTEC Aquaboard	AQUA G1H	850 x 1200	26 boards per pallet, 0.33 tonnes per pallet
15 mm GTEC Aquaboard	AQUA R2	1200 x 2400	40 boards per pallet, 1.60 tonnes per pallet
GTEC Aqua high-thread screws	41AHT1000	41 (length)	1000 screws/box, 6 boxes per carton
GTEC Aqua self-drilling screws	32ASD1000	32 (length)	1000 screws/box, 6 boxes per carton
GTEC Aqua self-tapping screws	32AST1000	32 (length)	1000 screws/box, 6 boxes per carton
GTEC Aqua self-tapping screws	41AST1000	41 (length)	1000 screws/box, 6 boxes per carton

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Lafarge GTEC Aquaboard Direct Render System.

Design Considerations

3 General

3.1 The system is satisfactory for use as an exterior wall cladding in timber-frame and steel-frame buildings.

3.2 The design should include:

- a ventilated and drained cavity system incorporating an insect guard to all ventilation openings
- effective detailing around window openings to ensure that wind-driven rain is excluded from hidden members in the surround and from the cavity
- an effective vapour control layer on the inside, to ensure the frame structure is protected.

3.3 The system should be kept above damp-proof course level and a minimum of 150 mm above ground level.

4 Practicability of installation

The system is designed to be installed by a competent builder, or a contractor, experienced with this type of system.

5 Strength and stability



5.1 The boards have adequate strength and can be used throughout the UK, without loss of serviceability.

5.2 A suitably qualified chartered engineer must check the design and method of installation of the panels.

5.3 The studs and support rails should be designed to limit mid-span deflections to $L/250$, and cantilever deflections to $L/180$.

5.4 The timber- or steel-frame structure, with or without Aquaboard, must be able to take the full wind loadings and racking loads.

5.5 For each wall panel, a partial safety factor of 1.3 and the values of modification factor k_{mod} given in Table 3 as defined in BS EN 1995-1-1 : 2008 (Eurocode 5), sections 2.4.1 and 3.1.3 respectively, are to be used to determine the design values of racking loads.

Table 3 Values of modification factors k_{mod}

Load duration class	Service class		
	Class 1	Class 2	Class 3
Short-term actions	0.9	0.7	0.5
Instant actions	1.1	0.9	0.7

5.6 Wind loads should be calculated in accordance with BS EN 1991-1-4 : 2005 (Eurocode 1) or BS 6399-2 : 1997.

5.7 The ultimate design pull-through value of Aquaboard, determined by tests using a minimum safety factor of 3 on the characteristic failure load for the stainless steel screws/Maxi screws⁽¹⁾, are given in Table 4.

Table 4 Pull-through values⁽¹⁾

Position	Pull-through value (kN)		
	GTEC Aqua high-thread screws	GTEC Aqua self-tapping screws	GTEC Aqua self-drilling screws
Centre	0.28	0.29	0.28

(1) For fasteners other than those specified, the Certificate holder's advice must be sought.

5.8 Ultimate design negative wind pressures for stud and screw spacings are presented in Table 5 based on pull-through values in Table 4.

Table 5 Wind load resistance

Batten spacing (mm)	Screw spacing (mm)	Ultimate design wind pressure ($N \cdot m^{-2}$)
600	200	2250
600	300	1500
400	200	3370
400	300	2250

5.9 The system should be designed to adequately resist wind pressures likely to be experienced in the UK. For other batten and screw spacing and design wind pressures, the structural adequacy of the Aquaboard should be checked by a suitably qualified engineer.

5.10 Design of the timber and steel battens should ensure that the pull-out capacity of the fixings is adequate (not covered by this Certificate). The maximum allowable pull-out value of the fixing to be used for securing the Aquaboard to the structural frame should be determined by tests using a minimum safety factor of 3 on the characteristic failure load.


6 Impact resistance

The board with reinforcement supported on battens at 600 mm, when tested for impact, was found to adequately resist 'soft body' impact energy of 120 N·m and the render system adequately resists 'hard body' impact energy of 10 N·m. Therefore, the system may be considered suitable for use in location categories B to F, as defined in BS 8200 : 1985, Table 2, reproduced in part in Table 6.

Table 6 Location categories

Category	Description	Examples	
B	Readily accessible to public and others with little incentive to exercise care. Chances of accidents occurring and of misuse	Walls adjacent to pedestrian thoroughfares or playing fields when not in category A	Zone of wall up to 1.5 m above pedestrian or floor level
C	Accessible mainly to those with some incentive to exercise care. Some chance of accident occurring and of misuse	Walls adjacent to private open gardens. Back walls of balconies	
D	Only accessible, but not near a common route, to those with high incentive to exercise care. Small chance of accident occurring or of misuse	Walls adjacent to small fenced decorative gardens with no through paths	
E	Above zone of normal impacts from people but liable to impacts from thrown or kicked objects	1.5 m to 6 m above pedestrian or floor level in public areas	
F	Above zone of normal impacts from people but not liable to impacts from thrown or kicked objects	Wall surfaces of high positions other than those defined in E above	

7 Performance in relation to fire

 7.1 The Aquaboard when tested for reaction to fire, achieved a classification of A2-s1, d0 in accordance with the BS EN 13501-1 : 2007.

7.2 One configuration of the Aquaboard system was tested for resistance to fire, with a loadbearing of 10 kN per stud, and achieved a fire performance of one-hour in accordance with BS 476-21 : 1987.

7.3 The system may be regarded as having a Class 0 surface ('low risk' in Scotland) in accordance with the following national Building Regulations:

England and Wales — Approved Document B

Scotland — Technical Handbooks⁽¹⁾⁽²⁾, Section 2

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet E.

7.4 Cavity barriers should be incorporated as required under the national Building Regulations, but should not block essential ventilation and drainage pathways. Guidance on fire barriers can be found in BRE report (BRE135 : 2003) *Fire Performance of External Insulation For Walls of Multi-Storey Buildings*.

8 Proximity of flues

When installing the system in close proximity to certain flue pipes or heat-producing appliances, the following provisions of the national Building Regulations should be met:

England and Wales — Approved Document J


Scotland — Mandatory Standard 3.19, clauses 3.19.1⁽¹⁾⁽²⁾ to 3.19.4⁽¹⁾⁽²⁾ and 3.19.8⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet L.

9 Weathertightness

 9.1 The system resists the passage of moisture from the ground and from weather. Any water collecting in the cavity due to rain or condensation will be removed by drainage and ventilation⁽¹⁾.

9.2 The air space between the back of the boards and the supporting wall or insulation should be as wide as possible and should allow for conventional building tolerances⁽¹⁾.

(1) Guidance on recommended cavity widths is given in *NHBC Standards*, Chapter 6.2 *External timber framed walls*, Chapter 6.9 *Curtain walling and cladding* and Chapter 6.10 *Light steel framed walls and floors*.

10 Water absorption

10.1 The board has moisture absorption class H1.

10.2 The water absorption of the board is less than 3% when tested in accordance with BS EN 520 : 2004 and BS EN 15283-1 : 2008.

11 Thermal conductivity and interstitial condensation

 11.1 The board has a thermal conductivity value of 0.25 W·m⁻¹·K⁻¹.

11.2 The board has a vapour resistivity of 0.69 MN·s·g⁻¹, a mean water vapour resistance factor (μ) of 11 in accordance with BS EN ISO 12572 : 2001, with condition B.

11.3 The relevant components of the system have a water vapour resistance such that, under the conditions likely to be found in dwellings in the United Kingdom, interstitial condensation should not occur within the insulation.

11.4 If a system is to be used on the external walls of rooms expected to have continuous high humidity, care must be taken in the design of the rooms to avoid possible problems from the formation of interstitial condensation in the wall.

11.5 When using Aquaboard, consideration must be given to the overall design to minimise the risk of condensation, and the recommendations contained in BS 5250 : 2002.

12 Mould resistance

The board provides maximum resistance when tested against mould growth provided both faces and the core are protected with biocides. Advice on appropriate fungicides can be obtained from the Certificate holder.

13 Maintenance and repairs



13.1 Periodic inspections are recommended to assess the need for cleaning, maintenance painting, localised repairs and element replacements, such as joints seals and fixings, to ensure that ingress of water does not occur. Necessary repairs should be effected immediately (see section 13.3).

13.2 Damaged areas must be repaired using appropriate materials and advice should be sought from the Certificate holder.

13.3 Damaged panels should be repaired or replaced as soon as is practicable, following the Certificate holder's instructions and observing all necessary health and safety regulations.

14 Durability



14.1 The durability and service life of the system will depend on the building location, immediate environment and intended use of the building, and proper maintenance and repairs.

14.2 Provided regular maintenance is carried out, as described in section 13 and in accordance with the Certificate holder's instructions, the system can be expected to have a service life in excess of 30 years when used in the normal climatic conditions found in the UK.

Installation

15 General

15.1 Installation of the system should be carried out strictly in accordance with the provisions of this Certificate and the Certificate holder's instructions.

15.2 The level of supervision during installation of the system and the associated structure, must be sufficient to ensure the quality of workmanship described in BS 8200 : 1985.

15.3 The frame to which the panels are fixed must be structurally sound and constructed in accordance with the requirements of the relevant national Building Regulations and Standards (see sections 15.4 and 15.5).

15.4 Timber stud walls and timber battens must be structurally sound, designed and constructed in accordance with BS 5268-2 : 2002 or BS EN 1995-1-1 : 2004 (Eurocode 5), and preservative treated in accordance with BS 5268-5 : 1989, BS 5589 : 1989 and BS EN 351-1 : 2007.

15.5 Galvanized steel framework must be structurally sound, designed and constructed in accordance with BS 5950-5 : 1998 or BS EN 1993-1-1 : 2005 (Eurocode 3).

15.6 The system is capable of transmitting its self-weight and wind load to the structure. The adequacy of the structural frame is outside the scope of this Certificate and must be verified by a suitably qualified engineer. Particular care is required around window and door openings to ensure that the structure is capable of sustaining the additional weight of the system.

15.7 Horizontal movement joints in accordance with BS EN 13914-1 : 2005 must be provided at every floor to accommodate vertical shrinkage of up to 6 mm in the timber frame and to follow movement joints in the substructure. For steel-frame structures, reference to the Structural Engineer's details for deflection at floor level and movement joints in the substructure should be made.

15.8 Vertical movement joints in accordance with BS EN 13914-1 : 2005 should be provided at a maximum of 15 m intervals. The actual spacing and position of the joints will be determined by the shape of the area to be rendered and should coincide with movement joints in the structure and allow for the same degree of movement.

15.9 When a breather membrane is required, it must be installed and properly overlapped in accordance with the instructions of the membrane manufacturer and the building designer.

15.10 All window and door openings are sealed strictly in accordance with the Certificate holder's installation instructions to ensure that they are weathertight (see Figures 3 and 4).

Figure 3 Window head and sill details

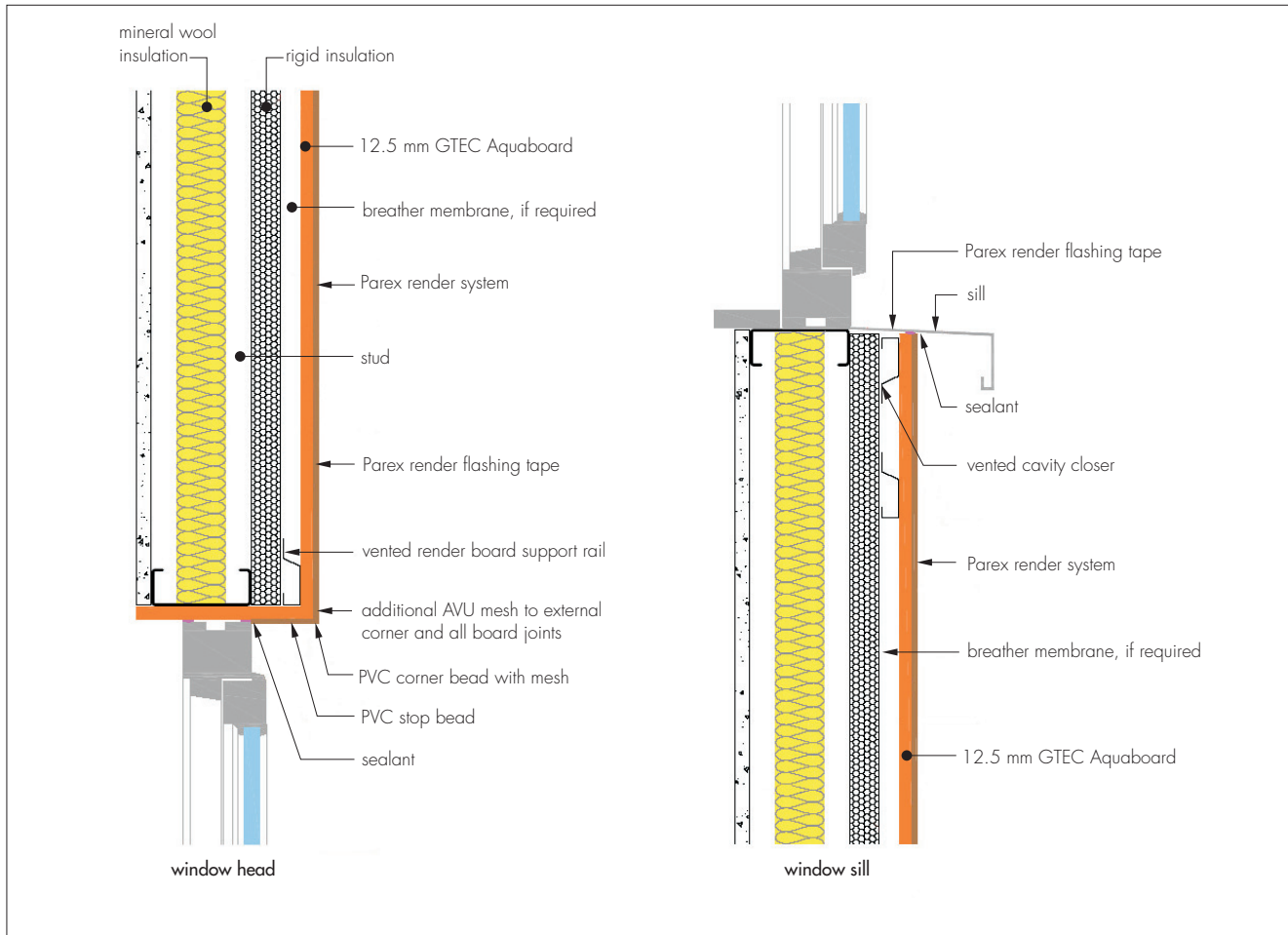
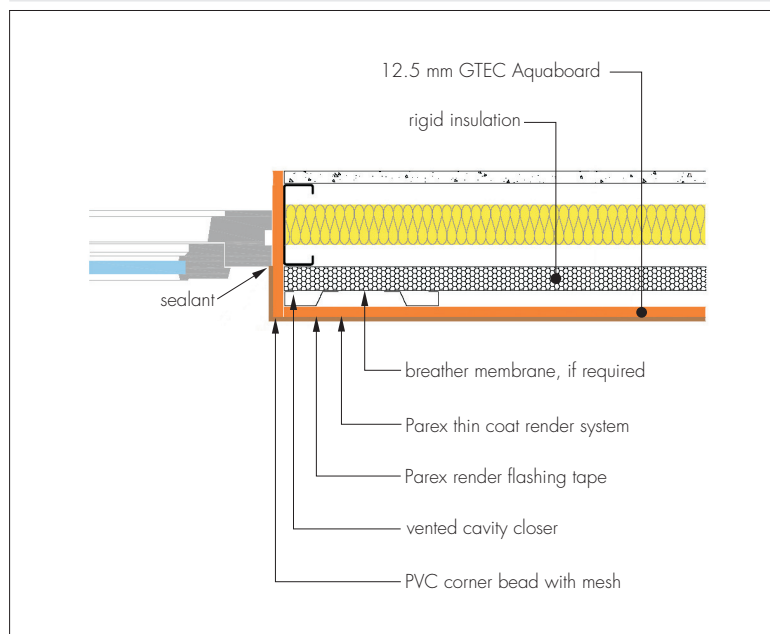


Figure 4 Window jamb details



15.11 Full system details for each application are available from the Certificate holder.

15.12 The frame studs or cavity drainage battens/rails shall be at a maximum of 600 mm centres.

15.13 Screws should be fixed at a minimum of 15 mm from board edges and a maximum of 300 mm for screw spacing for steel and timber frame applications. This must be checked and verified by a suitably qualified engineer. The screws should not be over-tightened (details are given in the Certificate holder's installation guide).

Render finish

15.14 The Certificate holder's advice should be sought regarding the preparation and application of the render system. Brief details are:

- Parex 121/Maite Monocomposant used as joint filler in conjunction with Parex 355 AVU mesh; as a basecoat minimum of 4 mm to 5 mm thick and as an adhesive, which is applied using a toothed trowel or with dabs
- Parex DPR/Revlane topcoat finishes available in an extensive range of colours — pre-mixed, ready to apply acrylic-based decorative coatings for external and internal walls. The finished appearance is based upon grain sizes of 1 mm and 1.25 mm (sand fine finish), 1.8 mm and 2.6 mm (sand coarse finish), 1.25 mm and 1.5 mm (swirl fine finish) and 3 mm (swirl coarse finish). The installed thickness of the topcoat finishes should follow the manufacturer's recommendations.

15.15 The basecoat is unsuitable for exposed façades or part of façades at an angle of more than 5° from the vertical.

15.16 The topcoat finish is unsuitable for exposed substrates inclined by more than 45° from the vertical.

Technical Investigations

16 Tests

16.1 Tests were carried out to determine:

- resistance to hard body impact
- pull-through strength of fixings
- pull-off strength of render
- resistance to freeze/thaw cycling to MOAT No 22 : 1988
- resistance to heat/sun cycling to MOAT No 22 : 1988.

16.2 The system's resistance to wind loading, mechanical resistance and stability was assessed.

16.3 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

17 Investigations

An assessment was made of the test data relating to:

- density
- bending strength
- modulus of elasticity in bending
- shear strength
- racking resistance
- resistance to organic growth
- dimensional stability
- water absorption
- water vapour permeability
- soft and hard body impact
- resistance to fire
- reaction to fire
- thermal conductivity.

Bibliography

- BS 476-21 : 1987 *Fire tests on building materials and structures — Methods for determination of the fire resistance of loadbearing elements of construction*
- BS 5250 : 2002 *Code of practice for control of condensation in buildings*
- BS 5268-2 : 2002 *Structural use of timber — Code of practice for permissible stress design, materials and workmanship*
- BS 5268-5 : 1989 *Structural use of timber — Code of practice for the preservative treatment of structural timber*
- BS 5589 : 1989 *Code of practice for preservation of timber*
- BS 5950-5 : 1998 *Structural use of steelwork in building — Code of practice for design of cold formed thin gauge sections*
- BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*
- BS 6497 : 1984 *Specification for powder organic coatings for application and stoving to hot-dip galvanized hot-rolled steel sections and preformed steel sheet for windows and associated external architectural purposes, and for the finish on galvanized steel sections and preformed sheet coated with powder organic coatings*
- BS 8200 : 1985 *Code of practice for design of non-loadbearing external vertical enclosures of buildings*
- BS EN 351-1 : 2007 *Durability of wood and wood-based products — Preservative-treated solid wood — Classification of preservative penetration and retention*
- BS EN 520 : 2004 *Gypsum plasterboards — Definitions, requirements and test methods*
- BS EN 594 : 1996 *Timber structures — Test methods — Racking strength and stiffness of timber frame wall panels*
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
- BS EN 1993-1-1 : 2005 *Eurocode -. Design of steel structures – General rules and rules for buildings*
- BS EN 1995-1-1 : 2004 *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*
- BS EN 10140 : 2006 *Cold rolled narrow steel strip — Tolerances on dimensions and shape*
- BS EN 10327 : 2004 *Continuously hot-dip coated strip and sheet of low carbon steels for cold forming — Technical delivery conditions*
- BS EN 13501-1 : 2007 *Fire classification of construction products and building elements. Classification using test data from reaction to fire tests*
- BS EN 13914-1 : 2005 *Design, preparation and application of external rendering and internal plastering — External rendering*
- BS EN 15283-1:2008 *Gypsum boards with fibrous reinforcement – Definitions, requirements and test methods – Gypsum boards with mat reinforcement*
- BS EN ISO 3506-1 : 1998 *Mechanical properties of corrosion-resistant stainless steel fasteners — Bolts, screws and studs*
- BS EN ISO 12572 : 2001 *Hygrothermal performance of building materials and products — Determination of water vapour transmission properties*
- BS EN ISO 13934-1 : 1999 *Textiles – Tensile properties of fabrics – Determination of maximum force and elongation at maximum force using the strip method*
- MOAT No 22 : 1988 *UEAtc Directives for the Assessment of External Insulation Systems for Walls (Expanded Polystyrene Insulation Faced with a Thin Rendering)*

18 Conditions

18.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English law.

18.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

18.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

18.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

18.5 Any information relating to the manufacture, supply, installation, use and maintenance of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.