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Agrément Certificate

10/4792

Product Sheet 3

STO RAINSCREEN CLADDING SYSTEMS

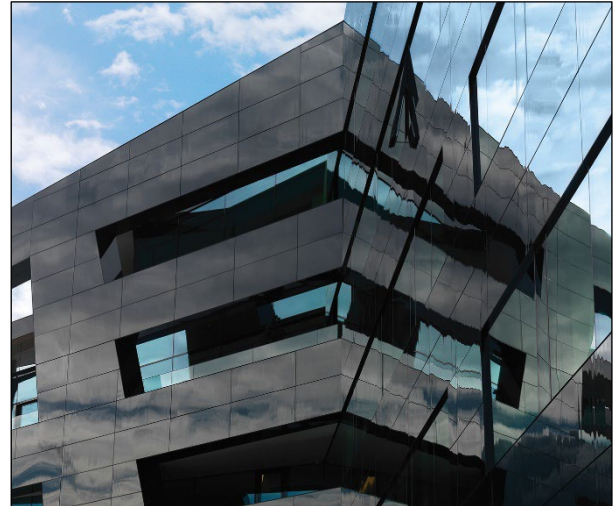
STOVENTEC GLASS A

This Agrément Certificate Product Sheet⁽¹⁾ relates to StoVentec Glass A, a rainscreen cladding system for use as a protective/decorative façade over the external walls of new or existing buildings.

(1) Hereinafter referred to as 'Certificate'.

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

Structural performance — the system can be designed to safely resist the wind and impact actions normally encountered in the UK (see section 6).

Behaviour in relation to fire — constructions incorporating the system can achieve an A2-s1, d0 reaction to fire classification to EN 13501-1 : 2018 and may be restricted in some cases (see section 7).

Air and water penetration — the vertical and horizontal joints between the panels will minimise water entering the cavity. Any water collecting in the cavity will be removed by drainage and ventilation (see section 8).

Durability — when installed and maintained in accordance with the Certificate holder's recommendations and this Certificate, the system will have a service life in excess of 30 years (see section 10).

The BBA has awarded this Certificate to the company named above for the system described herein. The 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: 18 March 2022

Hardy Giesler
Chief Executive Officer

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 MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

British Board of Agrément

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Regulations

In the opinion of the BBA, StoVentec Glass A, if installed, used and maintained in accordance with the provisions of this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	A1	Loading
Comment:		The system is acceptable for use as set out in sections 6.4 and 6.5 of this Certificate.
Requirement:	B3(4)	Cavities
Comment:		The system can contribute to satisfying this Requirement. See section 7.2 of this Certificate
Requirement:	B4(1)	External fire spread
Comment:		The system may be unrestricted by this Requirement. See sections 7.1 and 7.3 to 7.5 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The panels do not provide a watertight or airtight facing but will resist the passage of rainwater to the supporting structure. See section 8.1 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The system is acceptable. See section 10.1 and the <i>Installation</i> part of this Certificate.
Regulation:	7(2)	Materials and workmanship
Comment:		The system may be unrestricted by this Regulation. See sections 7.1 and 7.3 to 7.5 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		The system can contribute to a construction satisfying this Regulation. See section 10.1 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	1.1	Structure
Comment:		The system is acceptable for use, with reference to clauses 1.1.1 ⁽¹⁾⁽²⁾ , 1.1.2 ⁽¹⁾⁽²⁾ and 1.1.3 ⁽¹⁾⁽²⁾ of this Standard as set out in sections 6.4 and 6.5 of this Certificate.
Standard:	2.4	Cavities
Comment:		The system can contribute to satisfying this Standard, with reference to clause 2.4.2 ⁽¹⁾⁽²⁾ . See section 7.2 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The system is unrestricted by this Standard, with reference to clauses 2.6.4 ⁽¹⁾⁽²⁾ , 2.6.5 ⁽¹⁾ and 2.6.6 ⁽²⁾ . See sections 7.1 to 7.5 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The system is unrestricted by this Standard, with reference to clause 2.7.1 ⁽¹⁾⁽²⁾ . See sections 7.1 and 7.3 to 7.5 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The panels do not provide a watertight or airtight facing but will resist the passage of rainwater to the supporting structure, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.5 ⁽¹⁾⁽²⁾ . See section 8.1 of this Certificate.

Standard:	7.1(a)	Statement of sustainability
Comment:		The system can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting the bronze level of sustainability as defined in this Standard.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for the system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ .
		(1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23a(i)	Fitness of materials and workmanship
Comment:	(iii)b(i)	The system is acceptable. See section 10.1 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The panels do not provide a watertight or airtight facing but will resist the passage of rainwater to the supporting structure. See section 8.1 of this Certificate.
Regulation:	30	Stability
Comment:		The system is acceptable for use as set out in sections 6.4 and 6.5 of this Certificate
Regulation:	35(4)	Internal fire spread – Structure
Comment:		The system can contribute to satisfying this Requirement. See section 7.2 of this Certificate
Regulation:	36(a)	External fire spread
Comment:		The system may be unrestricted by this Regulation. See sections 7.1 and 7.3 to 7.5 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 3 *Delivery and site handling* (3.1, 3.4 and 3.5) and 9 *Maintenance* of this Certificate.

Additional Information

NHBC Standards 2022

In the opinion of the BBA, StoVentec Glass A, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards, Part 6 Superstructure (excluding roofs)*, Chapter 6.9 *Curtain walling and cladding*.

Technical Specification

1 Description

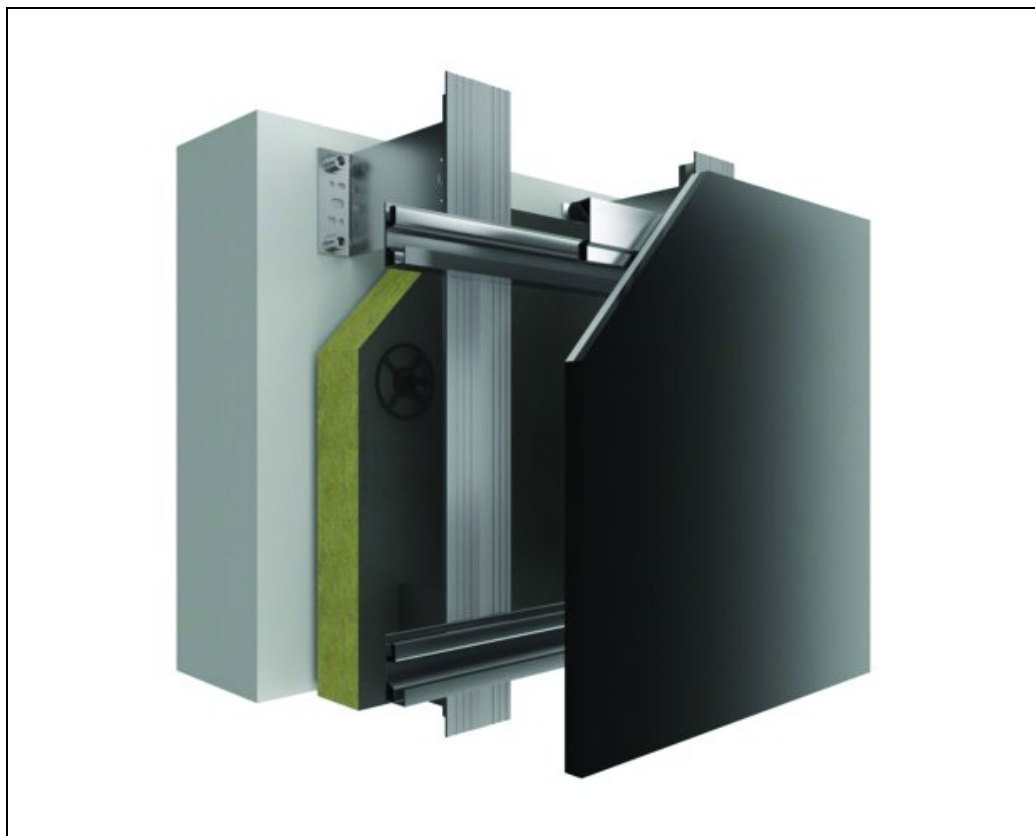
1.1 StoVentec Glass A comprises carrier boards with factory-bonded glass panels and aluminium support framing with associated stainless steel wall brackets and fixings, for use as a panelised external wall cladding system with a back-ventilated and drained cavity.

1.2 The carrier boards are manufactured from perlite bonded together with epoxy resin. The carrier boards have a nominal thickness of 15 mm and incorporate an anti-slip glass fibre mesh on both sides. They are available in any size

up to 3750 by 1500 mm, 4500 by 1250 mm, or 2600 by 2500 mm in portrait format, or 1500 by 3750 mm in landscape format.

1.3 The carrier boards incorporate purpose-made aluminium rails, fixed to their back face with mechanical fixings, and glass panel(s) bonded to the front face. The glass used is heat-soaked, thermally toughened, soda-lime silicate safety glass to EN 14175-1 : 2016. Glass panels are supplied in thicknesses of 6 or 8 mm, either as a single panel or, in exceptional cases depending on architectural specifications, as several pieces with joints filled with sealant (see Figure 1). The glass is available in most RAL colours or can be shaded a custom colour.

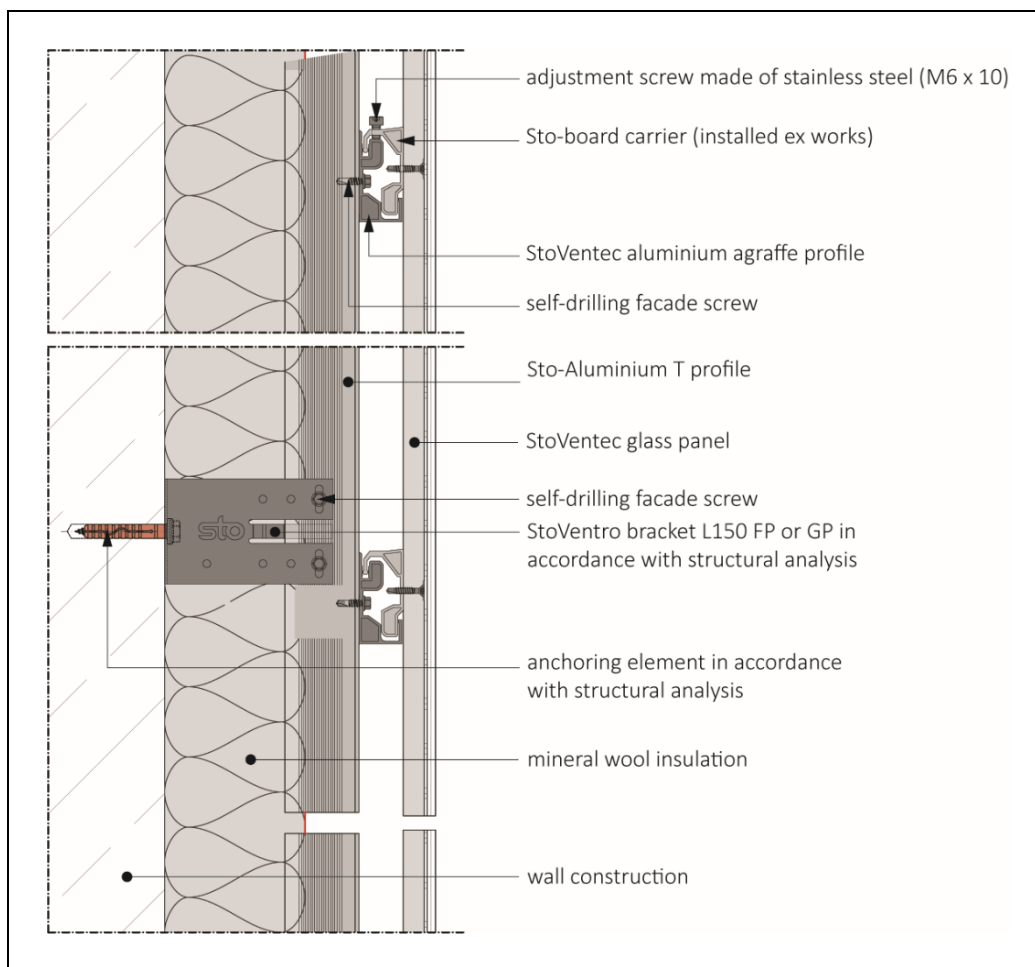
Figure 1 Sto Ventec Glass A



1.4 Ancillary items for use with the system, but outside the scope of this Certificate, include (see Figure 2):

- StoVentec horizontal aluminium support (agraffe) and vertical T or L profiles – aluminium grade EN AW 6063 to BS EN 755-2 : 2016 with a tensile strength of R_m 245 $N \cdot mm^{-2}$ and a yield strength of $R_{p0.2}$ 195 $N \cdot mm^{-2}$
- StoVentre wall brackets – stainless steel grade 1.4162 or 1.4301 to BS EN 10088-2 : 2014 with a thickness of 2.0 or 2.5 mm. Their length can vary and depends on the thickness of the insulation to be used. They may incorporate an optional thermally insulating pad
- fixings (Sto-Façade Connecting Screw A2 T20W 5.5 x 19mm or Sto-Façade Connecting Screw 5.5 x 19mm) – used to fix the aluminium rails to the wall brackets
- substrate anchors – used to fix the wall brackets to the substrate wall
- insulation — rigid or semi-rigid insulation boards or batts
- UV-resistant breather membrane
- cavity barriers
- protective cavity mesh.

Figure 2 Sto Ventec Glass A – support rails and fixings



2 Manufacture

2.1 The system components are either manufactured by the Certificate holder or bought-in from suppliers to an agreed specification.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of Sto Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by DQS (Certificate 003651 QM15).

2.4 The system is distributed from the Certificate holder's premises in Birmingham.

3 Delivery and site handling

3.1 The factory produced panels are delivered to site on pallets, wrapped in plastic and banded. Each pallet carries a label bearing the manufacturer's name and production batch number and a label bearing the BBA logo incorporating the number of this Certificate.

3.2 The panels should be stored off the ground on a firm, clean, level base and under cover until required for use. Care must be taken when handling to avoid damage.

3.3 Aluminium rails and profiles are delivered to site banded onto a wooden pallet with ancillary items in separate cardboard boxes.

3.4 Packs of rails should be stacked horizontally on sufficient bearers to prevent distortion, to a maximum height of 1 m. Other components should be stored in a safe weatherproof store.

3.5 Care should be taken when handling long lengths of rail, particularly at height, to avoid injury from sharp edges. Protective clothing must be worn and all Health and Safety rules observed.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Sto Ventec Glass A.

Design Considerations

4 General

4.1 Sto Ventec Glass A is satisfactory for use as back-ventilated and drained cavity rainscreen cladding system over external walls of new or existing buildings

4.2 It is important for designers, planners, contractors and/or installers to ensure that the installation of the system is in accordance with the Certificate holder's instructions and the information given in this Certificate. All design aspects should be checked by a suitably qualified and experienced individual, in accordance with the requirements of the relevant national Building Regulations and Standards.

4.3 The substrate wall to which the system is fixed must satisfy the requirements of the relevant national Building Regulations and Standards.

4.4 The substrate wall to which the system is fixed must be structurally sound, and designed and constructed in accordance with the requirements of the relevant national Building Regulations and Standards:

- timber-frame walls must be designed and constructed in accordance with PD 6693-1 : 2019, BS EN 1995-1-1 : 2004 and BS EN 1995-1-2 : 2004 and their UK National Annexes, with workmanship in accordance with BS 8000-5 : 1990, and preservative-treated in accordance with BS EN 351-1 : 2007 and BS 8417 : 2011
- steel-frame walls must be designed and constructed in accordance with BS EN 1993-1-1 : 2005, BS EN 1993-1-2 : 2005 and BS EN 1993-1-3 : 2006, and their UK National Annexes
- masonry walls must be designed and constructed in accordance with the relevant recommendations of BS EN 1996-1-1 : 2005, BS EN 1996-1-2 : 2005, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006 and their UK National Annexes, and BS 8000-0 : 2014 and BS 8000-3 : 2020
- concrete walls must be designed and constructed in accordance with BS EN 1992-1-1 : 2004 and BS EN 1992-1-2 : 2004, and their UK National Annexes.

4.5 Ventilation and drainage must be provided behind the cladding. As the rainscreen cladding panels are open jointed, the clear cavity between the back of the panel and the substrate wall (or insulation if installed on the substrate wall) must be at least 50 mm wide, and a minimum ventilation area of 5000 mm² per metre run of cladding must be provided. Joint gaps between the panels must not be less than 10 mm wide. All ventilation openings around the periphery of the system should be suitably protected with mesh to prevent the ingress of birds, vermin and insects.

4.6 To allow for longitudinal expansion, a minimum gap of 2.5 mm per metre length between adjacent support rails should be provided. For a standard length of 3 m, a gap of 10 mm between adjacent rails should be adequate. The panels must not be installed across this gap. To allow for expansion, the panels are installed on the sub-frame with one fixed fitted point in the middle of the panel and oversized holes for the edge fixings (see section 12.5).

4.7 Movement joints should be incorporated into the system in line with existing movement joints in the building structure and in accordance with the Certificate holder's recommendations for the specific installation.

4.8 As the panels are open-jointed, any insulation installed behind the cladding must be suitably fixed to the supporting wall to resist forces generated by wind actions and the insulation's self-weight. Insulation should be of a rigid or semi-rigid type (eg boards) and, where its performance could be diminished by moisture, a UV-resistant breather membrane should be provided over its outer face.

5 Practicability of installation

The system should only be installed by specialist rainscreen cladding installers who have been trained and registered by the Certificate holder.

6 Structural performance

6.1 The wind loads on the wall should be calculated in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. Special consideration should be given to locations with high wind-load pressure coefficients, as additional fixings may be necessary. In accordance with BS EN 1990 : 2002 and its UK National Annex, it is recommended that a partial factor of 1.5 be applied to the characteristic wind loading to determine the ultimate wind load to be resisted by the system.

6.2 The supporting substrate wall must have sufficient strength to resist independently the loads imparted directly by the system and wind actions normally experienced in the UK, as well as any in-plane force effects. The supporting subframe must have sufficient stiffness, such that its deformation does not affect the performance of the system. The system does not enhance the structural performance of the substrate wall.

6.3 The designer should ensure that:

- the design of the sub-frame and its fixings is in accordance with the relevant codes and Standards, such as to limit mid-span⁽¹⁾ deflections to span/200 and cantilever deflections to span⁽²⁾/150
- the panels are fixed to the sub-frame using the specified fixing mechanisms (see section 1.4)
- the specified fixings of the panel to the substrate have adequate tensile and pull-out strength to resist the applied actions
- fixing of the support brackets to the supporting wall has adequate tensile pull-out strength and corrosion resistance (outside the scope of this Certificate). An appropriate number of site-specific pull-out tests must be conducted on the substrate wall to determine the minimum pull-out resistance to failure of the fixings. The characteristic pull-out resistance should be determined in accordance with the guidance given in EOTA TR055, using 50% of the mean value of the five smallest measured values at the ultimate load.

(1) Vertical distance between the fixing brackets.

(2) Vertical distance between the bracket and the end of the rail subframe.



6.4 The design resistances against wind loads for different support arrangements are shown in Table 1. The resistances are derived from a combination of dynamic wind testing, flexural testing, bond strength testing of the carrier boards and glass panels, and testing of the fixings.

Table 1 Design resistance against wind loads for panels installed horizontally and vertically

StoVentec Glass A Panels	Number of board carrier profiles per panel	Max spacing between profiles for one panel	Max spacing between board carrier profiles and panel edge	Max horizontal spacing between fixing centres	Max span of supporting agraffe profiles	Design wind resistance
WxH (mm)	H	S (mm)	R (mm)	A (mm)	I (mm)	(kN·m ⁻²)
Horizontal panel arrangement						
2600 x 1250	2	750	250	255	1306	1.5
	2	750	250	255	871	2.4
	2	750	250	140	1306	2.4
	2	750	250	140	871	3.3
3750 x 1500	2	900	300	120	1250	1.65
	3	550	200	120	1250	2.4
	3	550	200	120	750	3.3
Vertical panel arrangement						
1250 x 2600	3	1000	300	200	1262	0.84
	3	1000	300	120	1262	1.50
	5	550	200	120	1262	2.40
	6	460	150	120	1262	3.30
2500 x 2600	3	1000	300	120	1250	1.5
	5	550	200	120	1250	2.4
	6	460	150	120	1250	3.3
1500 x 3750	6	720	265	120	750	3.3
	6	720	265	120	1000	3.3
1250 x 4500	6	864	318	120	625	2.4

Impact



6.5 When tested for resistance to hard and soft body impacts, a system comprising 21 mm thick Sto Ventec Glass A panels (1485 mm high by 987 mm wide), supported by vertical aluminium rails spaced 600 mm apart and horizontal backing rails spaced 395 mm apart, achieved adequate impact resistance for use in Exposure Category B⁽¹⁾ and above, as defined in CWCT TN75, Table 3 (an extract of which is shown in Table 2 of this Certificate), and CWCT TN76, with a ‘Class 4’ serviceability⁽¹⁾ and ‘Low risk’ safety⁽¹⁾ performance.

(1) The results apply only to the system configuration tested. Systems installed with support spans or fixings centres greater than that tested may not achieve the same classification.

Table 2 Exposure Categories (extract from CWCT TN76)

Use category	Description	Example
Areas less than 1.5 m from the ground		
A	Readily accessible to the public and others with little incentive to exercise care. Prone to vandalism and abnormally rough use.	External walls in vandal prone areas.
B	Readily accessible to the public and others with little incentive to exercise care. Chance of accident occurring and of misuse.	Walls adjacent to pedestrian thoroughfares when not in category A.
C	Accessible primarily to those with some incentive to exercise care. Some chance of accident occurring or of misuse.	Walls adjacent to private open gardens. Back walls of balconies.
D	Only accessible, but not near a common route, to those with a high incentive to exercise care. Small chance of accident occurring or of misuse.	Walls adjacent to small fenced decorative garden with no through paths.
Areas more than 1.5 m from the ground		
E	Above zone of normal impacts from people but liable to impacts from thrown or kicked objects. May also be subject to impact during maintenance.	1.5 to 6 m above pedestrian level in Location categories A and B.
F	Above zone of normal impacts from people and not liable to impacts from thrown or kicked objects. May also be subject to impact during maintenance.	Wall surfaces at higher positions than those defined in E above.

7 Behaviour in relation to fire



7.1 The panels have an A2-s1, d0⁽¹⁾ reaction to fire classification to EN 13501-1 : 2018 when installed with a cavity ≥ 50 mm over any A1 or A2 substrate with a thickness ≥ 9 mm and a density ≥ 652.5 kg·m⁻³. In addition, the panel size must be ≥ 0.1 m² and the joints between panels ≤ 15 mm wide. The panels must be fixed to an aluminium sub-frame and have a minimum cavity width of 50 mm behind the panels

(1) Refer to MFPA Report KB 3.1/19-009-4, dated 5 December 2019, available from the Certificate holder.

7.2 The reverse side of the panels (facing into the cavity) also has the reaction to fire classification of A2-s1, d0⁽¹⁾ BS EN 13501-1 : 2018 when installed under the same conditions. Cavity barriers should be provided in accordance with the requirements of the documents supporting the national Building Regulations, but should not block ventilation and drainage pathways.

7.3 The factory fitted aluminium rails and fixings on the back of the panels have an A1 reaction to fire classification in accordance with the relevant national regulatory guidance.

7.4 The system as described in this Certificate is not subject to any restriction on building height or proximity to boundaries. See section 7.1.

7.5 The classification in section 7.1 may not be achieved by other constructions, which should therefore be evaluated by reference to the requirements of the documents supporting the national Building Regulations and any consequent restrictions imposed by those documents, on a case-by-case basis.

7.6 Designers should refer to the relevant national Building Regulations and guidance for alternative approaches and detailed conditions of use, particularly in respect of requirements for substrate fire performance, cavity barriers, fire stopping of services and combustibility limitations for other materials and components used in the overall wall construction, for example, thermal insulation.

7.7 Where a wall incorporating the panels is subject to fire-resistance requirements, an appropriate test or assessment must be carried out by a laboratory accredited for the test concerned, by the United Kingdom Accreditation Service (UKAS), or equivalent accreditation body, or an assessment made by a suitably qualified and experienced individual.

8 Air and water penetration



8.1 The panels are suitable for use in back-ventilated and drained cladding systems. They do not provide a watertight or airtight facing but will contribute to resisting the passage of rainwater to the supporting structure.

8.2 The substrate wall onto which the system is installed must satisfy the requirements of the relevant national Building Regulations and Standards.

8.3 The amount of water entering the cavity by wind-driven rain will be minimal. Water collecting in the cavity owing to rain or condensation will be removed by drainage and ventilation.

8.4 The air space between the back of the panels and the external wall (or insulation, if installed within the cavity) must be at least 50 mm wide, which must be drained and ventilated and allow for conventional building tolerances. Guidance on recommended cavity widths and opening joint width between panels is given in NHBC Standards 2022, Chapters 6.2 and 6.9. The ventilation pathway behind the cladding must not be allowed to become blocked and openings should be suitably protected, or baffled, to prevent the ingress of birds, vermin and rain. Also see section 7.5 of this Certificate.

8.5 The designer should ensure the cladding system is designed with appropriate compartmentation of the cavity, and in accordance with the requirements of the NHBC Standards 2022, Chapter 6.9.

8.6 The panels are not weathertight and when used on timber stud or on metal frame substrate walls they must be backed by a breather membrane acting as a vapour-permeable water barrier, incorporated behind the cladding under the supporting battens. See also section 4.7 of this Certificate.

8.7 Provision must always be made to allow water that has penetrated behind the cladding to drain away.

9 Maintenance

9.1 The cladding should be inspected annually to ensure that rainwear is complete and in good order and that the cladding panels are in place and are secure.

9.2 Damaged panels cannot be repaired but should be replaced as soon as is practicable, in accordance with the Certificate holder's instructions and observing all necessary Health and Safety regulations.

10 Durability



10.1 In normal UK exposure conditions, the system can be expected to have a service life in excess of 30 years.

10.2 The aluminium and stainless steel support frame components will have a service life at least equivalent to that of the panels they are supporting.

Installation

11 General

11.1 Sto Ventec Glass A must be installed in accordance with the manufacturer's recommendations, the requirements of this Certificate and the design details prepared by the consulting engineer.

11.2 Installers must be specialist rainscreen cladding contractors who are trained and registered by the Certificate holder. The Certificate holder can provide technical assistance at the design stage and at the start of the installation.

12 Procedure

12.1 Based on the preliminary survey of the wall and architectural/structural design, a grid layout for the support frame is prepared.

12.2 The support brackets, with optional insulating pad, are fixed to the substrate wall using stainless steel fixings of appropriate size as determined by design (see section 6.3).

12.3 Where specified, insulation should be tightly butted around the brackets and secured to the substrate wall using appropriate fixings.

12.4 The vertical T-rails are clipped into the brackets and, after adjustment for line and level, fixed to them using self-drilling stainless steel screws or rivets of appropriate size, as determined by design.

12.5 Due allowance for expansion of the aluminium support rails against the substrate wall should be made, eg by providing a fixed connection at mid-span and sliding connection at the ends.

12.6 To protect the substrate wall or insulation from wind-driven rain, a suitable UV-resistant breather membrane or a suitably moisture-resistant insulation complying with BS EN 13162 : 2012 should be used.

12.7 Horizontal aluminium agraffe rails are fixed to the vertical T-rails at predetermined positions using the specified screws or rivets (see Figure 2).

12.8 Starting from the bottom of the installation, the panels are hooked onto the horizontal agraffe rails.

12.9 To allow for expansion of the carrier board and ventilation of the cavity, a joint gap of more than 10 mm should be provided.

13 Investigations

13.1 An assessment was made of test data relating to:

- wind load resistance
- hygrothermal performance (heat/spray cycling)
- resistance to freeze/thaw
- resistance to thermal shock
- flexural strength
- resistance to hard and soft body impact
- reaction to fire performance
- resistance of fixings.
- durability of bond strength between glazing and carrier boards.

13.2 The practicability of installation and the effectiveness of detailing techniques were assessed.

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

Bibliography

- BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*
BS 8000-3 : 2020 *Workmanship on building sites — Code of practice for masonry*
BS 8000-5 : 1990 *Workmanship on building sites — Code of practice for carpentry, joinery and general fixings*
- BS 8417 : 2011 + A1 : 2014 *Preservation of wood — Code of practice*
- BS EN 351-1 : 2007 *Durability of wood and wood-based products — Preservative-treated solid wood — Classification of preservative penetration and retention*
- BS EN 755-2 : 2016 *Aluminium and aluminium alloys. Extruded rod/bar, tube and profiles - Mechanical properties*
- BS EN 1990 : 2002 *Eurocode — Basis of structural design*
NA to BS EN 1990 : 2002 UK National Annex to *Eurocode — Basis of structural design*
- BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 — Actions on structures — General actions — Wind actions*
NA to BS EN 1991-1-4 : 2005 + A1 : 2010 UK National Annex to *Eurocode 1 — Actions on structures — General actions — Wind actions*
- BS EN 1992-1-1 : 2004 *Eurocode 2: Design of concrete structures — General rules and rules for buildings*
NA to BS EN 1992-1-1 : 2004 UK National Annex to *Eurocode 2: Design of concrete structures — General rules and rules for buildings*
BS EN 1992-1-2 : 2004 *Eurocode 2. Design of concrete structures — General rules — Structural fire design*
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- BS EN 1993-1-1 : 2005 + A1 : 2014 *Eurocode 3 — Design of steel structures — General rules and rules for buildings*
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NA to BS EN 1993-1-2 : 2005 UK National Annex to *Eurocode 3 — Design of steel structures — General rules — Structural fire design*
BS EN 1993-1-3 : 2006 *Eurocode 3. Design of steel structures — General rules — Supplementary rules for cold-formed members and sheeting*
NA to BS EN 1993-1-3 : 2006 UK National Annex to *Eurocode 3. Design of steel structures — General rules — Supplementary rules for cold-formed members and sheeting*
- BS EN 1995-1-1 : 2004 + A2 : 2014 *Eurocode 5 — Design of timber structures — General — Common rules and rules for buildings*
NA to BS EN 1995-1-1 : 2004 + A2 : 2008 UK National Annex to *Eurocode 5 — Design of timber structures — General — Common rules and rules for buildings*
BS EN 1995-1-2 : 2004 *Eurocode 5 — Design of timber structures — General — Structural fire design*
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BS EN 1996-3 : 2006 *Eurocode 6 — Design of masonry structures — Simplified calculations methods for unreinforced masonry structures*

NA + A1 : 2014 to BS EN 1996-3 : 2006 UK National Annex to Eurocode 6 — *Design of masonry structures — Simplified calculations methods for unreinforced masonry structures*

BS EN 10088-2 : 2014 *Stainless steels - Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

BS EN 13162 : 2012 *Thermal Insulation Products for Buildings - Factory Made Mineral Wool*

BS EN 13501-1 : 2018 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

EN 14175-1 : 2016 *Glass in building. Heat soaked thermally toughened soda lime silicate safety glass - Definition and description*

CWCT Technical Note No 75 : 2012 — *Impact performance of building envelopes: guidance on specification*

CWCT Technical Note No 76 : 2012 — *Impact performance of building envelopes: method for impact testing of cladding panels*

EOTA TR055 *Design of fastenings based on EAD 330232-00-0601, EAD 330499-00-0601 and EAD 330747-00-06-01*

PD 6693-1 : 2019 — *Recommendations for the design of timber structures to Eurocode 5 – Design of timber structures – General – Common rules and rules for building*

14 Conditions

14.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- 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.

14.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

14.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and 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.

14.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

14.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- 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
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

14.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal 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, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue 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.