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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
03/4022
Product Sheet 3

STRUCTHERM STRUCTURAL EXTERNAL WALL INSULATION SYSTEMS

STRUCTHERM STRUCTURAL EPS/PHENOLIC/PIR EXTERNAL WALL INSULATION SYSTEMS FOR STEEL-FRAMED STRUCTURES

This Agrément Certificate Product Sheet(1) relates to the Structherm Structural EPS/Phenolic/PIR External Wall Insulation Systems for Steel-Framed Structures, comprising standard expanded polystyrene (EPS), enhanced EPS, phenolic or polyisocyanurate (PIR) insulation in a mechanically-fixed galvanized or stainless steel cage, and render and brick-slip finishes. The systems are suitable for use on the outside of walls of new and existing domestic and non-domestic buildings, and are subject to height restrictions.

(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

Thermal performance — the systems can be used to improve the thermal performance of external walls and contribute to satisfying the requirements of the national Building Regulations (see section 6).

Strength and stability — correctly designed systems will adequately resist wind loads and impact damage (see section 7).

Behaviour in relation to fire — the systems have a B-s1, d0 reaction to fire classification. For height restrictions, see section 8.

Risk of condensation — the systems can contribute to limiting the risk of surface and interstitial condensation (see section 11).

Durability — when installed and maintained in accordance with the Certificate holder's recommendations and the terms of this Certificate, the systems will remain effective for at least 30-years (see section 13).

The BBA has awarded this Certificate to the company named above for the systems described herein. These systems have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 21 July 2014

John Albon — Head of Approvals Energy and Ventilation

Claire Curtis-Thomas
Chief Executive

Originally certificated on 6 February 2004

Certificate amended on 19 September 2014 to amend text in Table 4.
Certificate amended on 6 November 2019 to update fire regulations, and height restrictions where relevant.
Certificate amended on 26 August 2020 to update sections 4 and 7.

Regulations

In the opinion of the BBA, the Structherm Structural EPS/Phenolic/PIR External Wall Insulation Systems for Steel-Framed Structures, if installed, used and maintained in accordance with this Certificate, will 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 systems can sustain and transmit wind loads to the substrate. See sections 7.1 to 7.11 of this Certificate.
Requirement:	B3(4)	Internal fire spread – structure
Comment:		Some systems are restricted by this Requirement. See section 8.5 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The systems are restricted by this Requirement. See sections 8.1 to 8.5, 8.7 and 8.8 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The systems provide a degree of protection against rain ingress. See section 10.1 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The systems contribute to minimising the risk of surface and interstitial condensation. See sections 11.1, 11.2 and 11.4 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The systems can contribute to satisfying Requirement. See sections 6.2 and 6.3 of this Certificate.
Regulation:	7	Materials and workmanship (applicable to Wales only)
Regulation:	7(1)	Materials and workmanship (applicable to England only)
Comment:		The systems are acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	7(2)	Materials and workmanship (applicable to England only)
Comment:		The systems are restricted by this Regulation. See sections 8.1 to 8.5, 8.7 and 8.8 of this Certificate.
Regulation:	26	CO_2 emission rates for new buildings
Regulation:	26A	Fabric energy efficiency rates for new dwellings (applicable to England only)
Comment:		The systems can contribute to satisfying these Regulations. See sections 6.2 and 6.3 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		The systems can contribute to a construction satisfying this Regulation. See sections 12.1 and 13.1 and the *Installation* part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard	1.1	Structure
Comment:		The systems can sustain and transmit wind loads to the substrate. See sections 7.1 to 7.11 of this Certificate.
Standard:	2.4	Cavities
Comment:		The systems are restricted by this Standard with respect to clause 2.4.2[1][2]. See section 8.5 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The systems are restricted by this Standard with reference to clauses 2.6.4[1][2], 2.6.5[1] and 2.6.6[2]. See sections 8.1 to 8.5, 8.9 and 8.10 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The systems are restricted by this Standard with reference to clause 2.7.1[1][2]. See sections 8.1 to 8.5, 8.9 and 8.10 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The systems can satisfy this Standard, with reference to clauses 3.10.1[1][2] and 3.10.6[1][2]. See section 10.1 of this Certificate.
Standard:	3.15	Condensation
Comment:		The systems can satisfy the requirements of this Standard, with reference to clauses 3.15.1[1], 3.15.4[1] and 3.15.5[1]. See sections 11.3 and 11.4 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Buildings insulation envelope
Comment:		The systems can contribute to satisfying these Standards, with reference to clauses (or parts of) 6.1.1[1], 6.1.2[1][2], 6.1.3[2], 6.1.5[2], 6.1.6[1], 6.2.1[1], 6.2.3[1], 6.2.4[1], 6.2.5[1][2] and 6.2.10[2]. See sections 6.2 to 6.3 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The systems can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. In addition, the systems can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4[1][2] [Aspects 1[1][2] and 2[1]], 7.1.6[1][2] [Aspects 1[1][2] and 2[1]] and 7.1.7[1][2] [Aspect 1[1][2]]. See section 6.2 of this Certificate.

Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for these systems under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12[1][2] and Schedule 6[1][2]. (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012

Regulation:	23	Fitness of materials and workmanship
Comment:		The systems are acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	28	Resistance to moisture and weather
Comment:		The systems provide a degree of protection against rain ingress. See section 10.1 of this Certificate.
Regulation:	29	Condensation
Comment:		The systems contribute to minimising the risk of interstitial and surface condensation. See section 11.2 and 11.4 of this Certificate.
Regulation:	30	Stability
Comment:		The systems can sustain and transmit wind loads to the substrate. See sections 7.1 to 7.11 of this Certificate.
Regulation:	35(4)	Internal fire spread – structure
Comment:		Some systems are restricted by this Regulation. See section 8.5 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		The systems are restricted by this Regulation. See sections 8.1 to 8.5, 8.7 and 8.8 of this Certificate.
Regulation:	39	Conservation measures
Regulation:	40	Target carbon dioxide emission rate
Comment:		The systems can enable a construction to meet the requirements of these Regulations. See sections 6.2 to 6.3 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: 3 *Delivery and site handling* (3.2) of this Certificate.

Technical Specification

1 Description

1.1 The Structherm Structural EPS/Phenolic/PIR External Wall Insulation Systems for Steel-Framed Structures comprises standard expanded polystyrene (EPS), enhanced EPS, phenolic or polyisocyanurate (PIR) insulation in a mechanically-fixed galvanized or stainless steel wire cage, and render and acrylic brick-slip finishes.

1.2 The systems (see Figure 1) comprise:

Structherm steel cage panel

- galvanized[1] or stainless steel[2] 'cage', 1200 mm by 2400 mm (standard), with thicknesses of 75 mm (Type 1), 100 mm (Type 2), 125 mm (Type 3) and 150 mm (Type 4). Additional sizes are available on request. See section 2.1 of this Certificate.

(1) Galvanized steel drawn wire to BS 1052 : 1980, zinc plated 20 g·m^{-2} to 30 g·m^{-2} and tensile strength 600 N·mm^{-2} to 800 N·mm^{-2}.

(2) Austenitic stainless steel drawn wire, grade 304/1.4301 to BS EN 10088-1 : 2005 and tensile strength 750 N·mm^{-2} to 850 N·mm^{-2}.

Insulation

- insulation is cut into strips 50 mm or 100 mm wide and placed within the steel cage panel, with specific thicknesses depending on the panel thickness, as shown in Table 1.

Table 1 Insulation thickness sizes

Panel thickness (mm)	Insulation thickness (mm)
75	55
100	80
125	105
150	130

The types of insulation used are as follows:

- phenolic insulation — with a nominal density of 40 kg·m^{-3}, minimum compressive strength of 150 kN·m^{-2} and tensile strength perpendicular to the faces of 50 kPa. Boards are manufactured to comply with the requirements of BS EN 13166 : 2012
- standard expanded polystyrene (EPS) (white) insulation — with a nominal density of 15 kg·m^{-3}, minimum compressive strength of 70 kN·m^{-2} and minimum tensile strength of ≥ 100 kN·m^{-2}. The boards are manufactured to comply with the requirements for EPS 70, Class E material to BS EN 13163 : 2012
- enhanced expanded polystyrene (EPS) (grey) insulation — with a nominal density of 15 kg·m^{-3}, minimum compressive strength of 70 kN·m^{-2} and a nominal tensile strength perpendicular to the face of 150 kPa. The boards are manufactured to comply with the requirements for EPS 70, Class E material to BS EN 13163 : 2012
- polyisocyanurate (PIR) insulation — with a nominal density of 32 kg·m^{-3}, a minimum compressive strength of 150 kN·m^{-2} and a nominal tensile strength perpendicular to the face of 80 kPa. The boards are manufactured to comply with the requirements of BS EN 13165 : 2012.

Mechanical fixings and panel-retaining brackets

- SL Tek Screws(1) — galvanized steel or carbon steel with 5.5 mm nominal diameter, to be used with bespoke 80 mm by 40 mm galvanized or stainless steel washers or bespoke steel brackets.

(1) Other screws of similar or better characteristics approved by the Certificate holder can be used.

- BR01 panel-retaining brackets — 2 mm thick galvanized carbon steel or stainless steel bespoke c-channel bracket, 110 mm (height) by 135 mm (width) by 105 mm (length).

Basecoat

- Structherm Fibre Basecoat — a cement-based, polymer-modified basecoat with added fibres. Supplied in powder form.

Primers

- Structherm Silicone Primer — a water-based single-component primer, supplied in liquid form, for use with Structherm Silicone Texture finish
- Structherm Acrylic Brick-Slip Primer — a water-based single-component primer, supplied in liquid form, for use with Structherm Acrylic Brick-Slips.

Brick-slip adhesive

- Structherm Acrylic Brick-Slip Adhesive — a pre-mixed organic-bound, water-based cement-free adhesive.

Finishes

- Structherm Dash Receiver — a polymer-modified cement binder system containing fillers, and supplied in powder form
- Structherm Brick-Effect Render — a polymer-modified cement binder two-layer system containing fillers, produced in powder form
- Structherm Acrylic Brick-Slips — poly-acrylic slips containing quartz sands fillers. Standard sizes of 50 mm by 210 mm by 4 mm, 65 mm by 215 mm by 4 mm and 71 mm by 240 mm by 4 mm with a nominal weight of 6·kg·m^{-2}. Available as straight and corner brick-slips in a range of colours
- Structherm Silicone Texture — a polymer-modified, silicone coating system, produced in paste form in a range of colours, and containing grain (sizes: 1.0 mm, 1.2 mm, 1.5 mm, 2.0 mm).

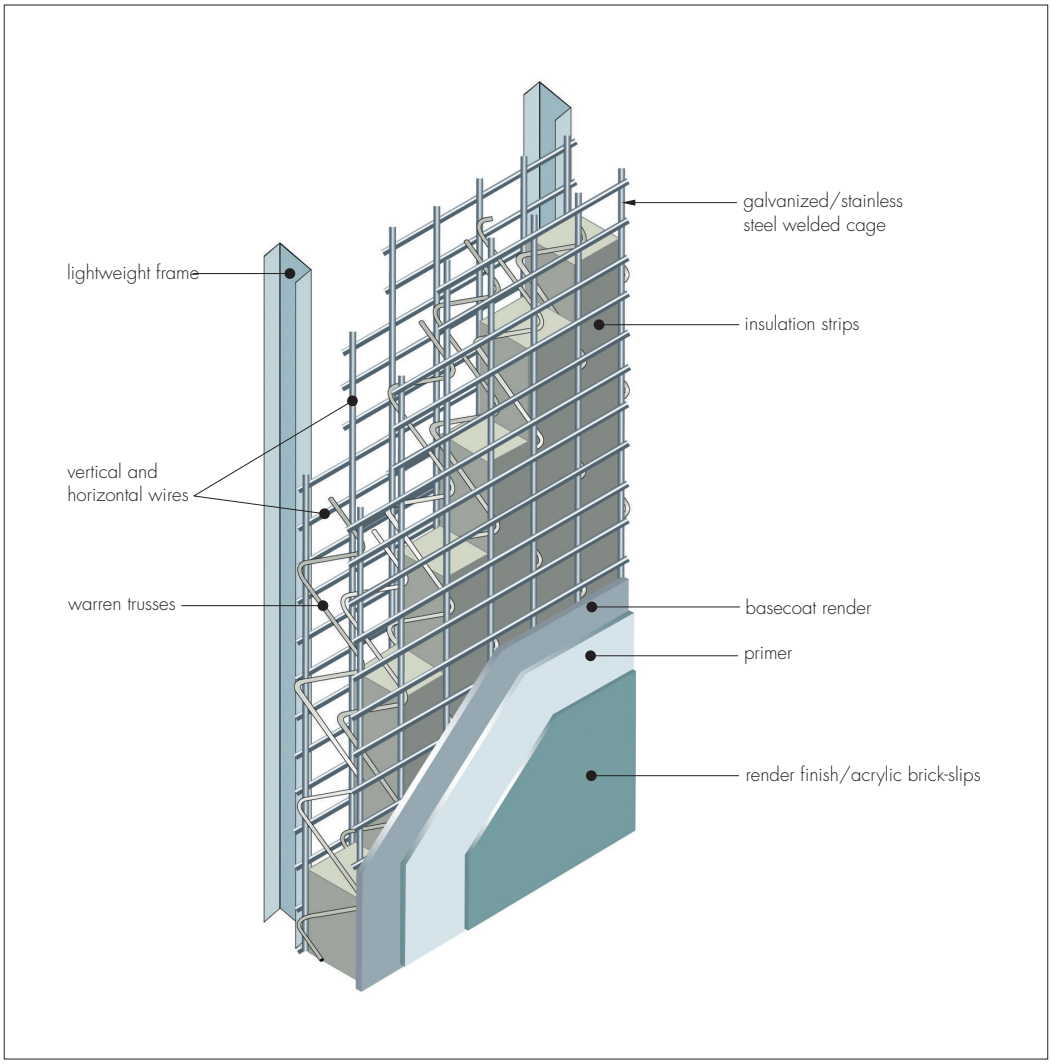
Aggregates

- Structherm Spar-Dash Aggregates, available in a range of sizes and colours.

1.3 Ancillary items supplied with the systems but outside the scope of this Certificate:

- base trims and connection channels — galvanized or stainless steel
- under and oversills, screw washers and mesh clips — galvanized steel to BS EN 10142 : 2000
- joint and corner reinforcing mesh — galvanized or stainless steel
- foam rubber filler strip
- profiles — a range of standard profiles for wall base, end stop, corner mesh and expansion joints. Profiles are available in organic polyester powder-coated galvanized steel or stainless steel and PVC
- profile fixings — hammer drive, fir tree or adhesive
- sealant — silicone sealant
- Vertex/Hartco clips.

Figure 1 Structherm Structural EPS/Phenolic/PIR External Wall Insulation System



1.4 The steel cage panel is fixed to the steel frame using mechanical fixings with bespoke washers or BR01 retaining brackets. The insulation boards are protected by basecoat, and selected finishes applied to the required thickness.

2 Manufacture

2.1 The steel cage panel is composed of steel drawn wire, formed into warren trusses (75 mm, 100 mm, 125 mm or 150 mm deep, to reflect the various panel thicknesses). Warren trusses comprise 2.96 mm diameter line wires, with 2.21(1) mm or 2.96(2) mm diameter bent diagonal wires spot-welded at 100(1) mm or 200(2) mm centres. Panel cross wires (2.03 mm diameter) are spot-welded to each panel face at 50 mm centres.

(1) For 75 mm (Type 1), 100 mm (Type 2) and 125 mm (Type 3) thickness panels.

(2) For 150 mm (Type 4) thickness panel.

2.2 Components are manufactured by the Certificate holder or bought in from suppliers, to an agreed specification.

2.3 As part of the assessment and ongoing surveillance of system quality, the BBA has:

- agreed with the manufacturer the quality control procedures and system 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.

2.4 The management system of Structherm Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 (Certificate CP 000183) and BS EN ISO 14001 : 2004 (Certificate CPE 00027) by CPC — Construction Products Certification.

3 Delivery and site handling

3.1 The Structherm panels are delivered to site wrapped in polythene. Each panel carries the system's identification and batch numbers.

3.2 Components are delivered in the packages and quantities listed in Table 2. Each package carries the manufacturer's system identification and batch number.

Table 2 Component supply details

Component	Quantity and packaging
Basecoat/powder finish coats	25 kg bags
Silicone primer	14 litre tubs/25 kg tubs
Acrylic brick-slip primer	15 kg tub
Silicone paste finish coat	25 kg tubs
Acrylic brick-slip adhesive	20 kg tub
Acrylic brick-slips: straight corner	 10 kg box 3.5 kg box
Mechanical fixings	boxed by manufacturer

3.3 The panels should be stored dry and under cover, on a firm, clean, level base, off the ground and protected from rust and prolonged exposure to sunlight and weather/frost until required for use. Care should be taken when handling the panels to avoid damage.

3.4 The insulation should be protected from solvents and bitumen and must not be exposed to open flame or other ignition sources.

3.5 The paste, liquid and powder products must be stored under cover in dry conditions off the ground and between 5°C and 30°C, and protected from frost at all times. Contaminated material must be discarded.

3.6 The acrylic brick-slip adhesive must be stored in frost-free conditions in temperatures not above 30°C and protected from exposure to sunlight. Tubs of unopened adhesive will have a shelf-life of up to 18 months when stored correctly.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Structherm Structural EPS/Phenolic/PIR External Wall Insulation Systems for Steel-Framed Structures.

Design Considerations

4 General

4.1 The Structherm Structural EPS/Phenolic/PIR External Wall Insulation Systems for Steel-Framed Structures, when installed in accordance with this Certificate, is satisfactory for use in reducing the thermal transmittance (U value) of external steel frame walls of new and existing buildings. It is essential that the detailing techniques specified in this Certificate are carried out to a high standard if the ingress of water into the insulation is to be avoided and the full thermal benefit obtained from treatment with the system (eg the insulation must be protected by an overhang, and window sills should be designed and installed so as to direct water away from the building).

4.2 For improved thermal/carbon-emissions performance, the designer should consider additional/alternative fabric and/or services measures.

4.3 The chosen system is applied to the outside of exterior walls of new or existing domestic and non-domestic steel-framed buildings, with height restrictions (see section 8 of this Certificate). The steel cage panels are designed to span between the existing columns of the steel frame structure. Prior to installation of the system, the wall surfaces should comply with section 14 of this Certificate.

4.4 New walls subject to the national Building Regulations should be constructed in accordance with the relevant recommendations of:

- BS EN 1993-1-1 : 2005 and its UK National Annex
- BS EN 1993-1-3 : 2005 and its UK National Annex
- BS 8000-0 : 2014
- BS EN 10346 : 2015.

4.5 New walls not subject to regulatory requirements should also be built in accordance with the Standards identified in section 4.4 of this Certificate.

4.6 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.

4.7 The structural frame of the building, is the responsibility of the building designer and is outside the scope of this Certificate. However, the structural frame (and sheathing-associated fixings) should be structurally adequate and must be designed to resist all permanent and variable load actions applied to the system (See Table 3 for the non-exhaustive minimum specifications for system installations relating to the light gauge steel). It is essential that appropriate movement joints are incorporated into the system (see section 4.6).

Table 3 Minimum steel frame construction requirements

Item	Characteristic	Specifications
Steel-framed structure[1]	Cold-formed steel frame members should be in accordance with BS EN 1993-1-3. The steel structure studs (maximum 600 mm centres) should be not less than 1.5 mm thick, with 50 mm (minimum) flanges to provide a minimum 50 mm bearing for the Structherm panel (50 mm on each side of the Structherm panel).	In accordance with BS EN 10346 type S 320 GD +Z275

(1) This component is outside the scope of this Certificate.

4.8 The system can improve the structural stability and weather resistance of a wall and provide a decorative finish. However, care should be taken to ensure that walls are adequately weathertight prior to application. The system should only be installed where there are no signs of dampness on the inner surface of the wall.

4.9 The effect of the system on the acoustic performance of a construction is outside the scope of this Certificate.

4.10 The fixing of sanitary pipework, plumbing, rainwater goods, satellite dishes, clothes lines, hanging baskets and similar items to the system is outside the scope of this Certificate.

4.11 External pipework and ducts should be removed before installation, and alterations made to underground drainage to accommodate repositioning of the pipework to the finished face of the system. The Certificate holder can advise on suitable fixing methods.

4.12 The designer should select a construction appropriate to the local wind-driven rain index, paying due regard to the design detailing, workmanship and materials to be used. Any sheathing board used must be of a suitable exterior grade with appropriately sealed joints, sealed penetrations and vapour control layers (VCL) where required. For guidance, examples of relevant detailing for external wall insulation systems are given in SCI publication P343 Insulated Render Systems Used with Light Steel Framing (Steel Construction Institute, 2006)

4.13 The steel cage panels can be designed to span between the existing columns of the substrate. The systems are for use on steel-framed structures which incorporate vertical steel studs at appropriate centres to accommodate the specific Structherm panel width and incorporate steel wire panels which are directly fixed to the steel structure (see Table 7).

4.14 It is essential that this system is installed and maintained in accordance with the conditions set out in this Certificate.

5 Practicability of installation

The systems should be installed only by specialised contractors who have successfully undergone training and registration by the Certificate holder.

Note: The BBA operates a UKAS-accredited Approved Installer Scheme for external wall insulation; details of approved installer companies are included on the BBA website, www.bbacerts.co.uk.

6 Thermal performance

6.1 Calculations of thermal transmittance (U value) should be carried out in accordance with BS EN ISO 6946 : 2007, BS EN ISO 10211 : 2007 and BRE Report BR 443 : 2006, using the thermal conductivity (λ_D value) of the insulation materials given in Table 4.

Table 4 Insulation thermal conductivity

Insulation	Thickness (mm)	λ_D value ($W \cdot m^{-1} \cdot K^{-1}$)
Standard EPS (white)	50 - 200	0.038
Enhanced EPS (grey)	50 - 200	0.032
Phenolic	25 -44	0.021
	45 -120	0.020
PIR	≤ 79	0.026
	80 - 119	0.025
	120 - 200	0.024

6.2 The U value of a wall construction will depend on the selected insulation, the insulation thickness and the insulating value of the substrate and its internal finish. Example U values for existing constructions, before and after installing the panels, are given in Table 5.

Table 5 Example U values[1] achieved after installing the Structherm Structural External Wall Systems

Existing construction	Existing U value ($W \cdot m^{-2} \cdot K^{-1}$)	Steel cage panel type	Insulation thickness (mm)	Finish U value ($W \cdot m^{-2} \cdot K^{-1}$)
BISF (ground floor)	0.99	125 mm galvanized steel cage	105	0.30
BISF (first floor)	1.10	125 mm galvanized steel cage	105	0.30
BISF (ground floor)	0.99	125 mm stainless steel cage	105	0.23
BISF (first floor)	1.10	125 mm stainless steel cage	105	0.24
Cruden Rural	0.77	125 mm galvanized steel cage	105	0.25
Cruden Rural	0.77	125 mm stainless steel cage	105	0.20

(1) U values based on:
- 200 truss wires per m^2
- 2 mm diameter wires
- 25 mm air gap between insulation and substrate
- 24 mm external render.

6.3 The systems can contribute to maintaining continuity of thermal insulation at junctions between elements and openings. For Accredited Construction Details, the corresponding ψ-values (psi) in BRE Information Paper IP 1/06, Table 3, may be used in carbon emission calculations in Scotland and Northern Ireland. Detailed guidance for other junctions and on limiting heat loss by air infiltration can be found in:

England and Wales — Approved Documents to Part L and, for new thermal elements to existing buildings, Accredited Construction Details (version 1.0). For new build, see also SAP 2009, Appendix K, and the *iSBEM User Manual*

Scotland — Accredited Construction Details (Scotland)

Northern Ireland — Accredited Construction Details (version 1.0).

7 Strength and stability

General

7.1 The Certificate holder is ultimately responsible for the design of the system and it is the responsibility of the company installing the system to accurately follow the installation instructions (also see section 5 of this Certificate). The Certificate holder must also verify that a suitably experienced and qualified individual (with adequate professional indemnity) establishes that:

- the design wind loads on all zones of the building elevation for the specific installation site have been calculated correctly (see section 7.3)
- the system can adequately resist and safely transfer the calculated loads, accounting for all possible failure modes, to the substrate wall and supporting structure (see sections 7.3 to 7.11).

7.2 The substrate and supporting structure must be capable of transferring all additional loading due to the installation of the system to the ground in a satisfactory manner. The adequacy of the substrate and supporting structure must be verified by the person or party responsible for the global stability of the building to which the system is applied. Any defects should be made good prior to the system being installed.

7.3 Design wind loads on the walls should be calculated, taking into account all relevant factors such as location and topography, in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. All the factors affecting design wind load on each elevation and specific zone of the building must be considered. In accordance with BS EN 1990 : 2002 and its UK National Annex, a partial load factor of 1.5 must be applied to the characteristic values determined from BS EN 1991-1-4 : 2005 to establish the design wind load to be resisted by the system.

7.4 Installations, if completed in accordance with this Certificate based on correct design and detailing, will safely accommodate the applied loads due to the self-weight of the system, wind and impact.

7.5 Positive wind load is transferred to the substrate wall directly via compression of the render and the steel cage insulation system.

7.6 Negative wind load is transferred to the substrate wall via[1]:

- the bond between the sandwiched wire cage panels and render system
- the resistance of the anchor plate to breakdown or detachment
- the pull-out resistance of the fixing from the substrate (see section 7.7).

(1) Further guidance is given in BBA Guidance Note 1, available on the BBA website (www.bbacerts.co.uk).

7.7 Typical characteristic pull-out resistances for the fixings taken from the corresponding European Technical Assessment (ETA) are given in Table 6; the values are dependent on the fixing type and must be selected to suit the specific loads and substrate concerned. In situations where suitable data does not exist[1], the characteristic pull-out resistance must be established from site-specific pull-out tests conducted on the substrate of the building to ascertain the minimum resistance to pull-out failure of the fixings, and determined in accordance with the guidance given in EOTA

TR051 (minimum test characteristic value = 0.6 x mean of 5 lowest test results). To obtain the design pull-out resistance of the fixings (N_{RD1}), this characteristic pull-out resistance should then be divided by the partial factor given in Table 6.

(1) To qualify as suitable data, the age and condition of the substrate must be equivalent to that used to establish the values in the ETA.

Table 6 Fixings – typical characteristic pull-out resistances

Fixing type	ETA	Substrate	Characteristic pull-out resistance[1](kN)	Partial factor[2]
5.5 mm diameter self-drilling fixing (EJOT JT2-3-5.5)	10/0200	Through the support rails (1.5 mm thick)	3.4	1.33

(1) Values are dependent on the substrate. The Use Categories are defined in the corresponding ETA.

(2) To obtain the typical design pull-out resistance (N_{RD1}) of the fixing, the characteristic pull-out resistance should be divided by the partial factor given.

7.8 The racking resistance of the system is outside the scope of the Certificate and the contribution of the system to the overall design racking resistance of the building may be estimated on a case specific basis.

7.9 The spacing, layout and number of wire cage panel fixings was confirmed by a dynamic wind uplift test and assessment. Provided the substrate wall is suitable and the appropriate fixings are selected, the wire cage panel and associated fixings will adequately support the system, and transfer its self-weight and wind and impact loads to the substrate wall at the maximum spacing given in Table 7. The design negative wind load that can be sustained by the system as determined from the dynamic wind uplift test (R_{dTest}) $kN \cdot m^{-2}$[1][2] is derived from and would be found in Table 7, below:

Table 7 Design and resistances[1] by support centres and fixing types[2]

Panel designation (mm)	Pressure	Design wind-load ($kN \cdot m^{-2}$) by support centres (mm)					
		Washer plater (minimum of six per Structherm panel)			BR01 bracket (minimum of four per Structherm panel)		
		600	1200	2000	2000	3000	3600
75 mm	Positive	4.00	3.80	1.40	2.00	1.60	1.60
	Negative	4.00	3.80	1.40	2.00	1.60	1.60
100 mm	Positive	4.00	3.90	2.10	2.65	2.15	1.90
	Negative	4.00	3.90	2.10	2.65	2.15	1.90
125 mm	Positive	4.00	3.90	2.10	2.65	2.15	1.90
	Negative	4.00	3.90	2.10	2.65	2.15	1.90
150 mm	Positive	4.00	3.90	2.10	2.65	2.15	1.90
	Negative	4.00	3.90	2.10	2.65	2.15	1.90

(1) The main criteria in the derivation of the loads were:

- reinforcement consists of a total of 24 to 26 mm thick render applied to the panel
- this Table is based on experimental data and an empirical analysis of such data
- the spans ensure deflection is limited to span/200 for positive and negative pressure
- the panel is subjected to wind loads and self-weight only
- for spans greater than 2000 mm, a bespoke BR01 bracket must be used
- each washer plate or BR01 bracket with the Structherm panel must have a minimum 50 mm bearing on the steel substrate upright
- The Certificate holder can advise on design windload resistances for other spans which fall within the limitations detailed in Table 7.

(2) Assuming correct type and number of fixings used.

7.10 The horizontal deflection of the supporting structure due to variable loads should be within acceptable limits, ensuring the deflection is limited to span/200 for positive and negative pressure. The Certificate holder may advise on the limiting deflection for the system.

7.11 The data derived from sections 7.7 to 7.10 must be assessed against the design wind load, and the following expressions must be satisfied:

For safe design:

$R_{dTest} \geq W_e/1.5$ and $n_{RD1} \geq W_e$

where:

R_{dTest} is the design negative wind load resistance of the system based on test ($kN \cdot m^{-2}$)

W_e is the maximum design wind load ($kN \cdot m^{-2}$)

n_{RD1} is the design pull-out resistance of the system based on characteristic values from site tests and the number of fixings per unit area must be greater than or equal to the ones used in the DWU test ($kN \cdot m^{-2}$).

Impact resistance

7.12 Hard body impact tests were carried out in accordance with ETAG 004 : 2013 and the systems are suitable for use in all Use Categories[1].

(1) The Use Categories are defined in ETAG 004 : 2013 as:

- Category I — a zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected to abnormally rough use

- Category II — a zone liable to impacts from thrown or kicked objects, but in public locations where the height of the systems will limit the size of the impact; or at lower levels where access to the buildings is primarily top those with some incentive to exercise care
- Category III — a zone not likely to be damaged by normal impacts caused by people of by thrown or kicked objects.

8 Behaviour in relation to fire

8.1 The reaction to fire classification of the systems is B-s1, d0 in accordance with BS EN 13501-1: 2007.

8.2 The fire classification applies to the full range of insulation thicknesses covered by this Certificate.

8.3 The classification applies to the full range of colours and finishes (including render) covered by this Certificate.

8.4 The EPS, PIR and phenolic insulation materials in isolation are not classified as non-combustible.

8.5 The reverse side of the system (insulation facing into the cavity) has a reaction to fire classification of F for PIR insulation; E for EPS insulation; and C-s2, d0 for phenolic insulation, to BS EN 13501-1 : 2007.

8.6 Designers should refer to the relevant national Building Regulations and guidance for detailed conditions of use, particularly in respect of requirements for substrate fire performance, cavity barriers, service penetrations and combustibility limitations for other materials and components used in the overall wall construction.

8.7 In England, Wales and Northern Ireland, the systems are restricted for use in buildings up to 18 m in height.

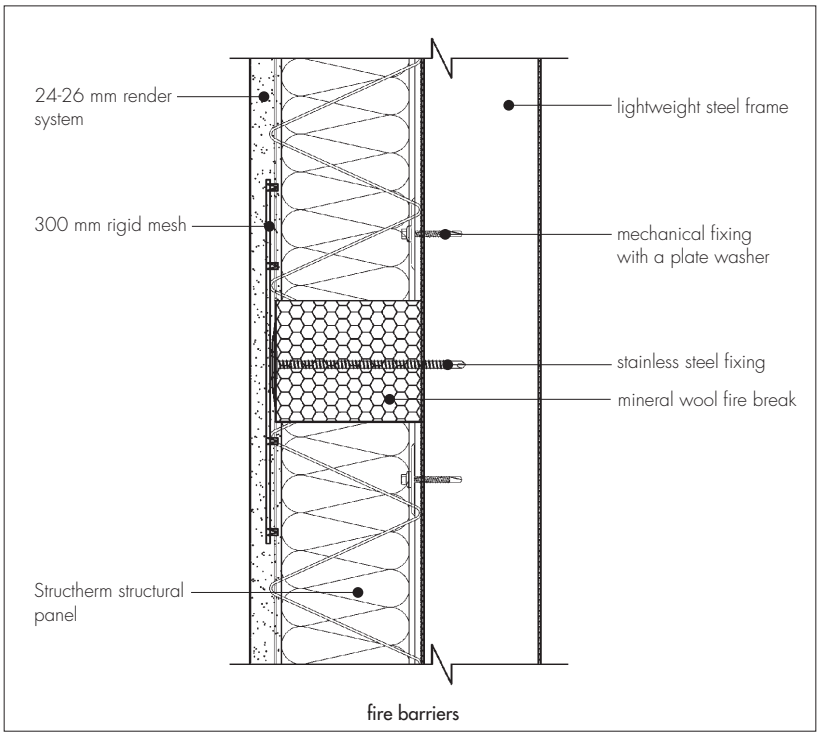
8.8 In England, Wales and Northern Ireland, the systems are not classified as 'non-combustible' or 'of limited combustibility' and may be used on buildings at any proximity to a boundary.

8.9 In Scotland, the systems are not classified as 'non-combustible' and may be used on buildings more than 1 m from a boundary and, on houses, 1 m or less from a boundary. With minor exceptions, the systems should be included in calculations of unprotected area, except on houses where the external wall behind has the appropriate fire resistance.

8.10 In Scotland, the systems should not be used on any building with a storey more than 11 m above the ground, or on any entertainment or assembly building with a total storey area more than 500 m^2, or on any hospital or residential care building with a total storey area more than 200 m^2.

8.11 For application to second storey walls and above, it is recommended that the designer considers fire barriers in line with compartment walls and floors as advised in BRE Report BR 135 : 2013 (see Figure 2 of this Certificate).

Figure 2 Fire barriers



9 Proximity of flues and appliances

When the insulation systems are installed in close proximity to certain flue pipes, the relevant provisions of the national Building Regulations should be met:

England and Wales — Approved Document J

Scotland — Mandatory Standard 3.19, clause 3.19.4[1][2]

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

10 Water resistance

10.1 The systems will provide a degree of protection against rain ingress. However, care should be taken to ensure that walls are adequately weathertight prior its application. The insulation systems may only be installed where there are no signs of dampness on the inner surface of the substrate other than those caused solely by condensation.

10.2 Designers and installers should take particular care in detailing around openings, penetrations and movement joints to minimise the risk of rain ingress.

10.3 The guidance given in BRE Report BR 262 : 2002 should be followed in connection with the weathertightness of wall constructions. The designer should select a construction appropriate to the local wind-driven index, paying due regard to the design detailing, workmanship and materials to be used.

10.4 At the tops of walls, the systems should be protected by an adequate overhang or other detail designed for use with these types of systems.

11 Risk of condensation

11.1 Designers must ensure that an appropriate condensation risk analysis has been carried out for all parts of construction, including openings and penetrations at junctions between the insulation system, to minimise the risk of condensation. The recommendations given in BS 5250 : 2011 should be followed.

Surface condensation

11.2 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.7 $W \cdot m^{-2} \cdot K^{-1}$ at any point and the junctions with other elements and openings comply with section 6.3.

11.3 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 1.2 $W \cdot m^{-2} \cdot K^{-1}$ at any point. Guidance may be obtained from BS 5250 : 2011 (Section 8, Annex D) and BRE Report BR 262 : 2002.

Interstitial condensation

11.4 Walls incorporating the systems will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with this Certificate.

11.5 The equivalent air layer thickness (S_d) and water vapour resistance factor (μ) for the insulations and finishes are as given in Table 8.

Table 8 Equivalent air layer thickness (S_d) and water vapour resistance factor (μ)

Description	S_d (m)	μ
Expanded polystyrene (white/grey)	—	60[1]
Phenolic	—	50[1]
PIR	—	60[2]
Structherm Dash Receiver + Dash Aggregate	—	0.14[4]
Structherm Silicone Texture	0.20[3]	—
Structherm Acrylic Brick-Slips	0.19[3]	—
Structherm Brick-Effect Render Finish	0.20[3]	—

(1) Taken from BS EN ISO 10456 : 2007, Table 4.
(2) Taken from BS EN 12524 : 2000, Table 2.
(3) Obtained from test on basecoat, primer and render finish together.
(4) Obtained from test on Structherm Dash Receiver only.

12 Maintenance and repair

12.1 Regular checks should be made on the installed system, including:

- visual inspection of the render for signs of damage. Cracks in the render exceeding 0.2 mm must be repaired
- visual inspection of the acrylic brick-slips for signs of disbondment. Dislodged slips should be re-fixed using Structherm Acrylic Brick-Slip Adhesive
- examination of the sealant around openings and service entry points
- visual inspection of architectural details designed to shed water to confirm that they are performing properly
- visual inspection to ensure that water is not leaking from external downpipes or gutters; such leakage could penetrate the rendering
- necessary repairs effected immediately and the sealant joints at window and door frames replaced at regular intervals

- maintenance schedules, which should include the replacement and resealing of joints, for example between the insulation systems and window and door frame.

12.2 Damaged areas must be repaired using the appropriate components and procedures detailed in the Certificate holder's installation instructions and in accordance with BS EN 13914-1 : 2005.

13 Durability

13.1 The systems will have a service life of at least 30-years, provided any damage to the surface finish is repaired immediately, and regular maintenance is undertaken as described in section 12.

13.2 Any render containing Portland cement may be subject to lime bloom. The occurrence of this may be reduced by avoiding application in adverse weather conditions. The effect is transient and is less noticeable on lighter colours.

13.3 The finishes may break up the flow of water on the surface and reduce the risk of discoloration by water runs. The finish may become discoloured with time, the rate depending on locality, initial colour, the degree of exposure and atmospheric pollution, as well as the design and detailing of the wall. In common with traditional renders, discoloration by algae and lichens may occur in wet areas. The appearance may be restored by a suitable power wash or, if required, by over coating.

13.4 To maintain a high quality aesthetic appearance, it may be necessary to periodically overcoat the building using systems compatible coatings recommended by the Certificate holder and in accordance with BS EN 1062-1 : 2004. Care should be taken not to adversely affect the water vapour transmission or fire characteristics of the system. The advice of the Certificate holder should be sought as to the suitability of a particular product.

Installation

14 Site survey and preliminary work

14.1 A pre-installation survey of the property must be carried out to determine suitability for treatment and the need for any necessary repairs to the building structure before application of the Structherm Structural EPS/Phenolic/PIR External Wall Insulation System. A specification must be prepared for each elevation of the building indicating, for example:

- position of starter tracks and render beads
- additional rigid corner mesh at corners of openings
- detailing around windows, doors and at eaves
- damp-proof course (dpc) level
- location and type of weather seals to be used and location of water-deflection channels
- areas where flexible sealants must be used
- position of fire barriers.

14.2 The survey should include tests conducted on the substrate of the building by the Certificate holder or their approved installers (see section 15) to determine the pull-out resistance of the proposed mechanical fixings. An assessment and recommendation is made on the type and number of fixings required to withstand the building's expected wind loading based on calculations using the relevant wind speed data for the site and the pull-out resistances (see section 7).

14.3 A detailed survey of the existing cladding must also be carried out by a suitably experienced and competent individual. Where the existing cladding is removed, the exposed frame must be wire-brushed to remove any minor rust and significantly-corroded sections of steelwork should be replaced. All the steelwork should be painted with a protective coating in accordance with BS EN ISO 12944-5 : 2007.

14.4 Where surfaces are covered with an existing rendering, it is essential that the bond between the background and the render is adequate. All loose areas should be hacked off and reinstated.

14.5 On existing buildings, purpose-made sills must be fitted to extend beyond the finished face of the system. New buildings should have suitably deep sills designed to prevent water ingress, which should incorporate drips to shed water clear of the system.

14.6 Internal wet work, eg screeding or plastering, should be completed and allowed to dry prior to the application of a system.

15 Approved Installers

Application of the system, within the context of this Certificate, is carried out by approved installers recommended or recognised by the Certificate holder. Such an installer is a company:

- employing operatives who have been trained and approved by the Certificate holder to install the system
- which has undertaken to comply with the Certificate holder's application procedure, containing the requirements for each application team to include at least one member operative trained by the Certificate holder
- subject to at least one inspection per annum by the Certificate holder to ensure suitable site practices are being employed. This may include unannounced site inspections.

16 Procedure

General

16.1 Application of the system must be carried out in accordance with the Certificate holder's current installation instructions.

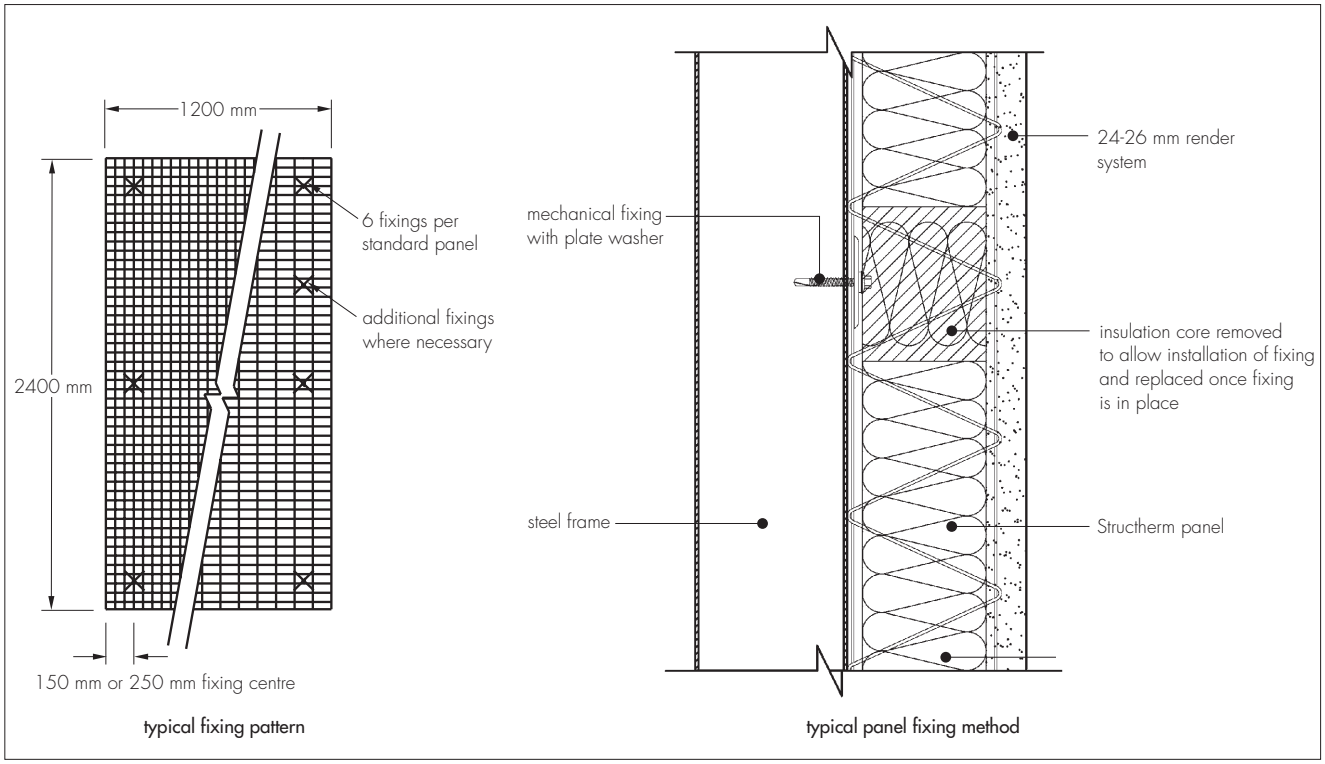
16.2 Weather conditions should be monitored to ensure correct curing conditions. Application of coating materials must not be carried out at temperatures below 5°C (and should remain above freezing for 24 to 48 hours after application) or above 30°C, or if exposure to frost is likely. The coating must be protected from rapid drying.

16.3 All rendering should be in accordance with the relevant recommendations of BS EN 13914-1 : 2005.
Positioning and securing steel cages

16.4 The galvanized or stainless steel base trim is fixed above the dpc using profile fixings at 300 mm centres. Base rail connectors are inserted at all rail joints.

16.5 Each standard size panel spans the steel-frame columns and is fixed to the substrate with at least six mechanical fixings with bespoke washers or four bespoke BR01 brackets, two on top and two at the bottom. If a panel is to be fixed to columns with a spacing greater than or equal to 2 m, brackets must be used. Part-panels are fixed with at least three anchors with washers (see Figure 3).

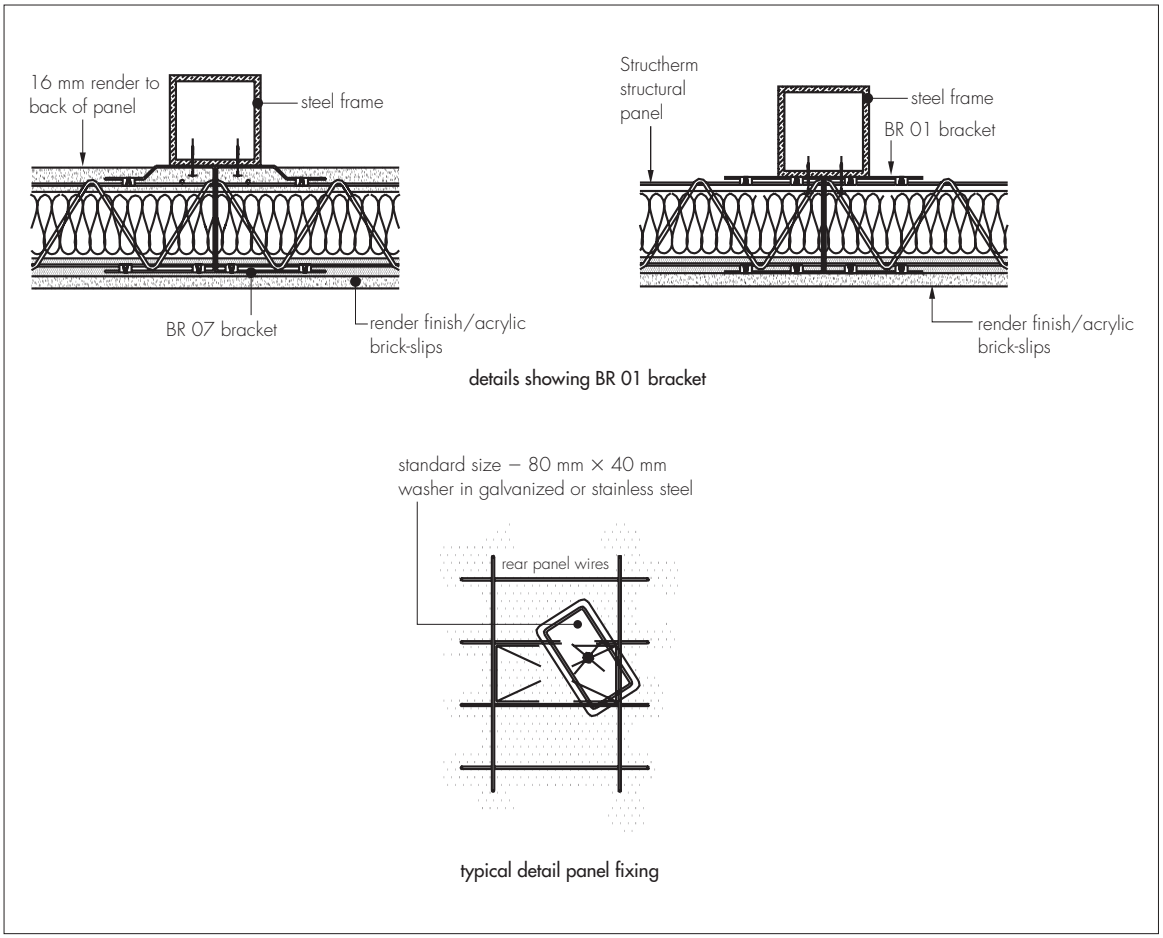
Figure 3 Typical panel fixing pattern and method



16.6 Sections of the insulant core of the panel are removed by carefully cutting out with a fine-toothed saw at the fixing points.

16.7 For each fixing point, the required hole depth is drilled into the steel-frame according to the fixing manufacturer's recommendations. The panel is secured with a bespoke steel washer (ensuring two of the panel wires are trapped against the substrate) then the insulant core replaced (see Figure 4).

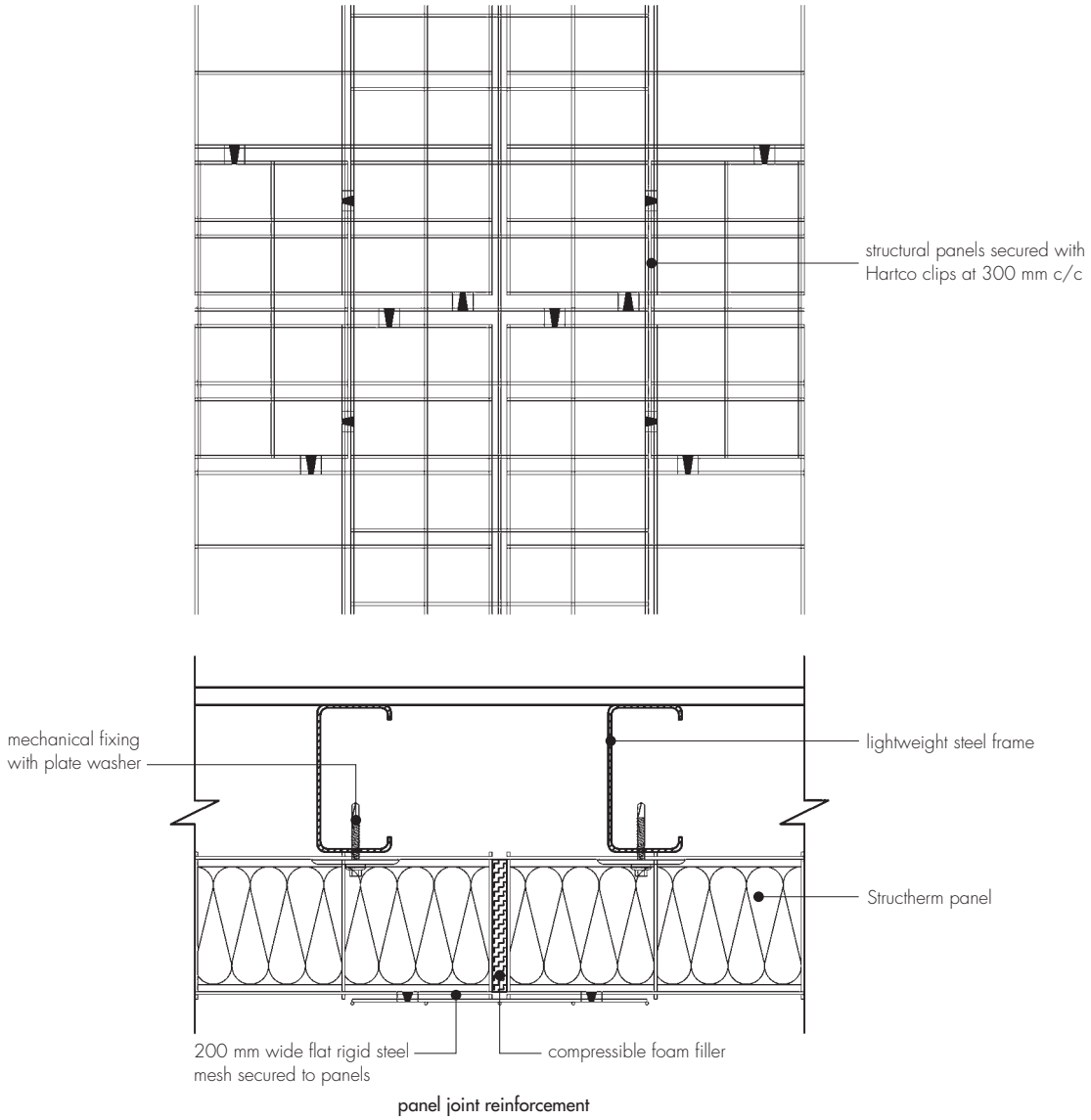
Figure 4 Typical fixing details



16.8 Lengths of compressible filler strip are positioned in the vertical and horizontal joints between subsequent panels, and fixing to the structural frame continues as previously described.

16.9 Panel-to-panel fixing is completed with jointing meshes (with a minimum 100 mm overlap either side of the panel joint), which are clipped to the panel face using pneumatically-applied Vertex/Hartco clips at 150 mm staggered centres (see Figure 5).

Figure 5 Panel joint reinforcement



panel joint reinforcement

16.10 Where necessary, standard panels can be cut to size (to fit around details such as doors and windows) with an abrasive disc saw. The wire and insulant core of the panel are cut through from one side, the panel turned over, and the cut completed from the other side. The cut edges are reinforced at the joints with 200 mm wide flat mesh, clipped at 150 mm centres to each panel.

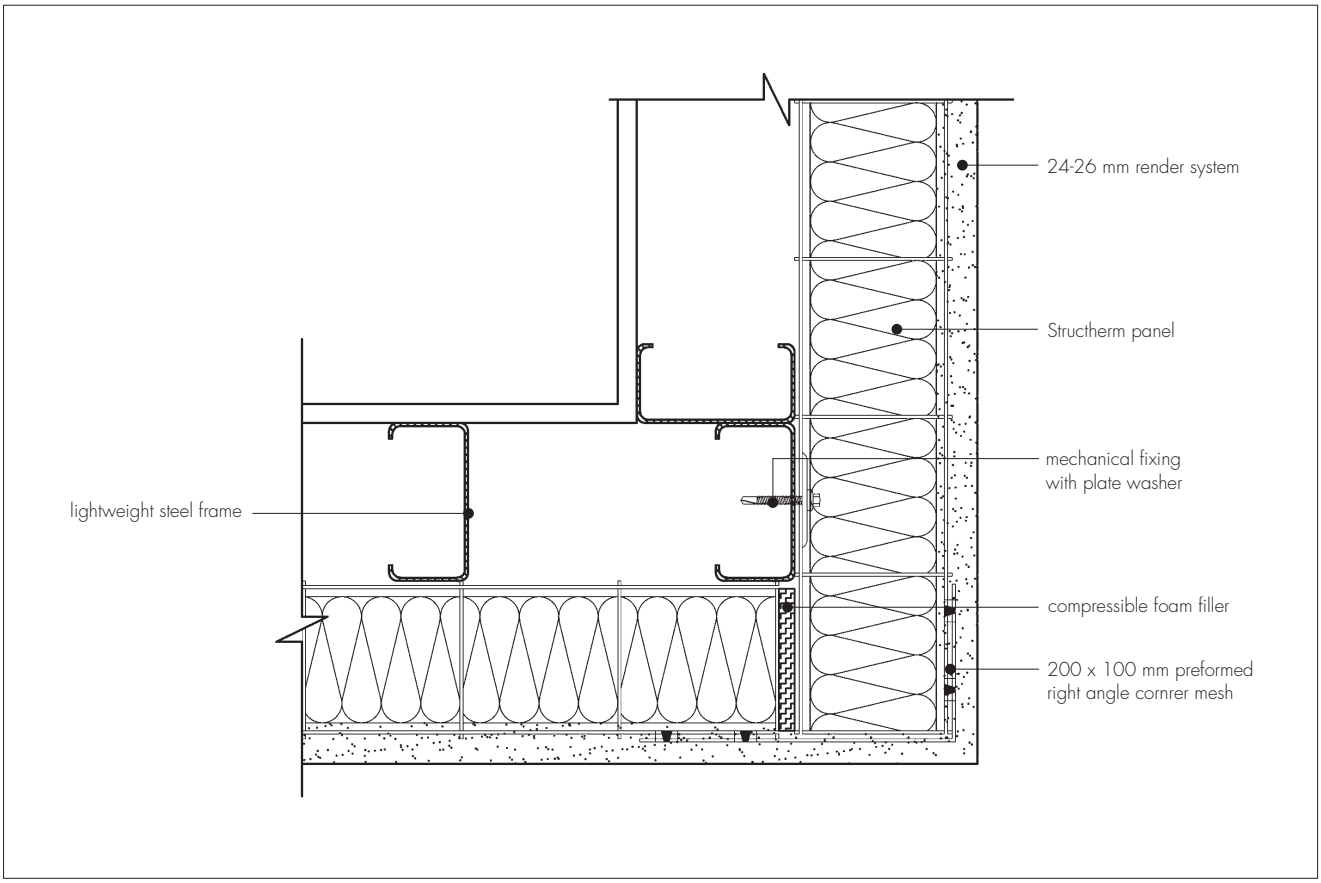
16.11 Installation continues until the whole wall is completely covered.

16.12 Prior to the application of the reinforcement coat, pre-compressed sealing tape is inserted at window and door frames, overhanging eaves, gas and electric meter boxes, and wall vents, or where the render abuts any other building material or surface. Alternatively, gun-applied joint sealants or the use of proprietary sealing beads can be used in accordance with the Certificate holder's instructions.

16.13 Pre-manufactured corner meshes are used at external/internal corners and to window/door reveals to provide additional reinforcement and render support. Mesh sizes are bespoke to project detail and relevant to panel type/ thickness, ensuring minimum a 100 mm overlap to the corner of the panel (see Figure 6).

16.14 Where fixtures are located on the structure (eg wall vents, balanced flues, electric boxes) the panel should be cut to fit neatly around the obstruction. In some cases, fillets of insulant, encased in wire mesh, are fixed to allow splayed rendering around the fixture. Heavy cables on external walls are left in position and covered with a metal 'top hat' section. The panels are then fitted over the top.

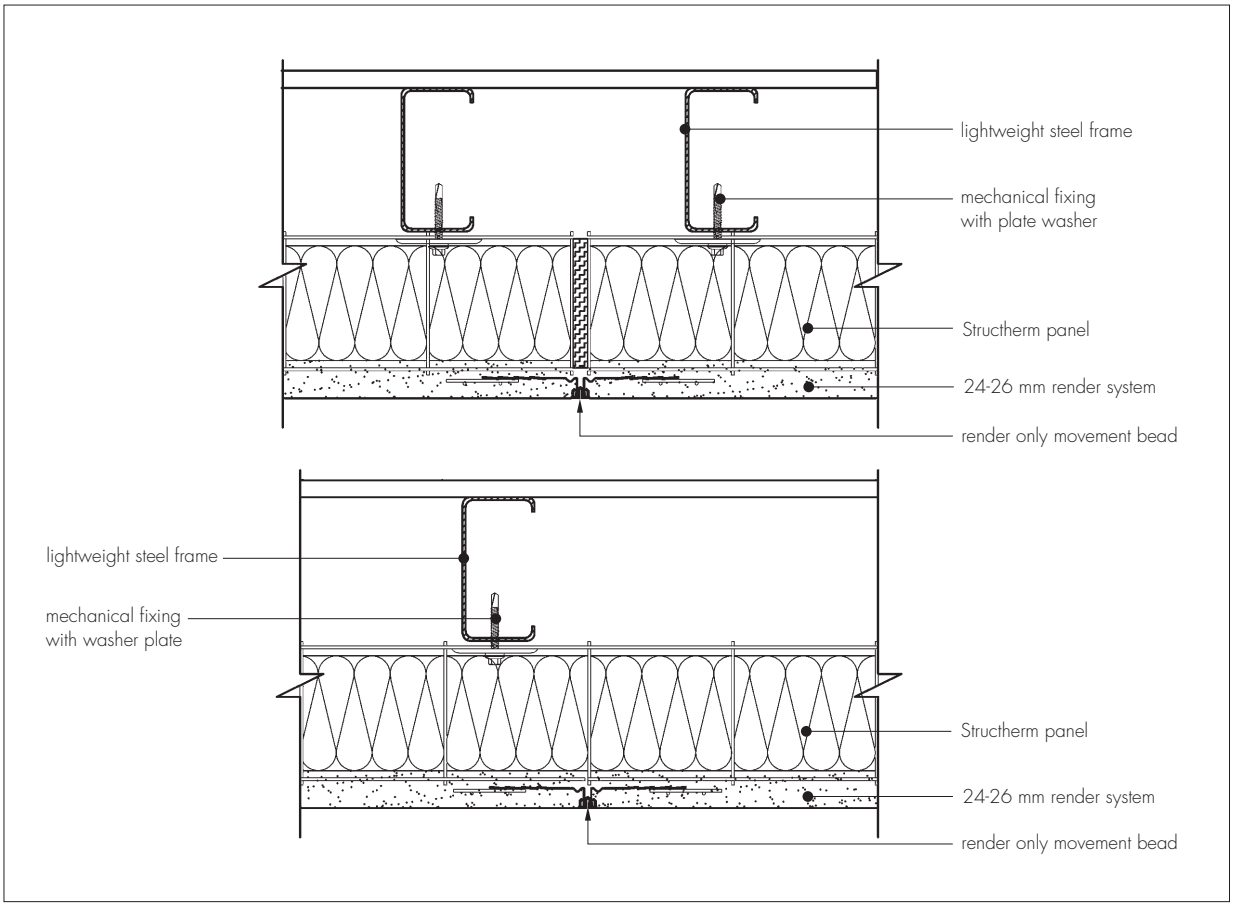
Figure 6 Corner detail



Movement joints

16.15 Movement joints in the substrate should be continued through the systems using purpose-made PVC, powder-coated galvanized steel or stainless steel trims (see Figure 7) in addition, surface-mounted movement joints can be installed, with the cage wire cut behind prior to application. The basecoat should have a crack induced at the movement joint location.

Figure 7 Typical movement joint



16.16 Expansion beads are fixed vertically in agreed positions, depending on the individual requirements of each job (but at approximately seven metre centres along a building)

Basecoat

16.17 The basecoat is prepared by mixing the contents of each 25 kg bag with approximately 4 to 5 litres of cold, clean water, using a concrete or paddle mixer or pump machine. Mixing times should be at least five minutes to allow an even dispersion of the resins.

16.18 The basecoat is applied onto the surface of the panel, built up in layers to a total thickness of 16 mm to 24 mm — the amount required depending on the finish chosen — ensuring 2 mm to 3 mm coverage over panel wires. Care must be taken to achieve complete coverage of the cage and to butt the basecoat under details such as window sills. The surface of the basecoat is trowelled smooth and then scored with a toothed-trowel or comb to provide a good key for the next coat.

16.19 The drying period will depend on weather conditions but each basecoat layer must be left to harden for at least two days (48 hours) before application of the next coat. After the basecoat has hardened, any contaminants such as grease and chalking should be removed,

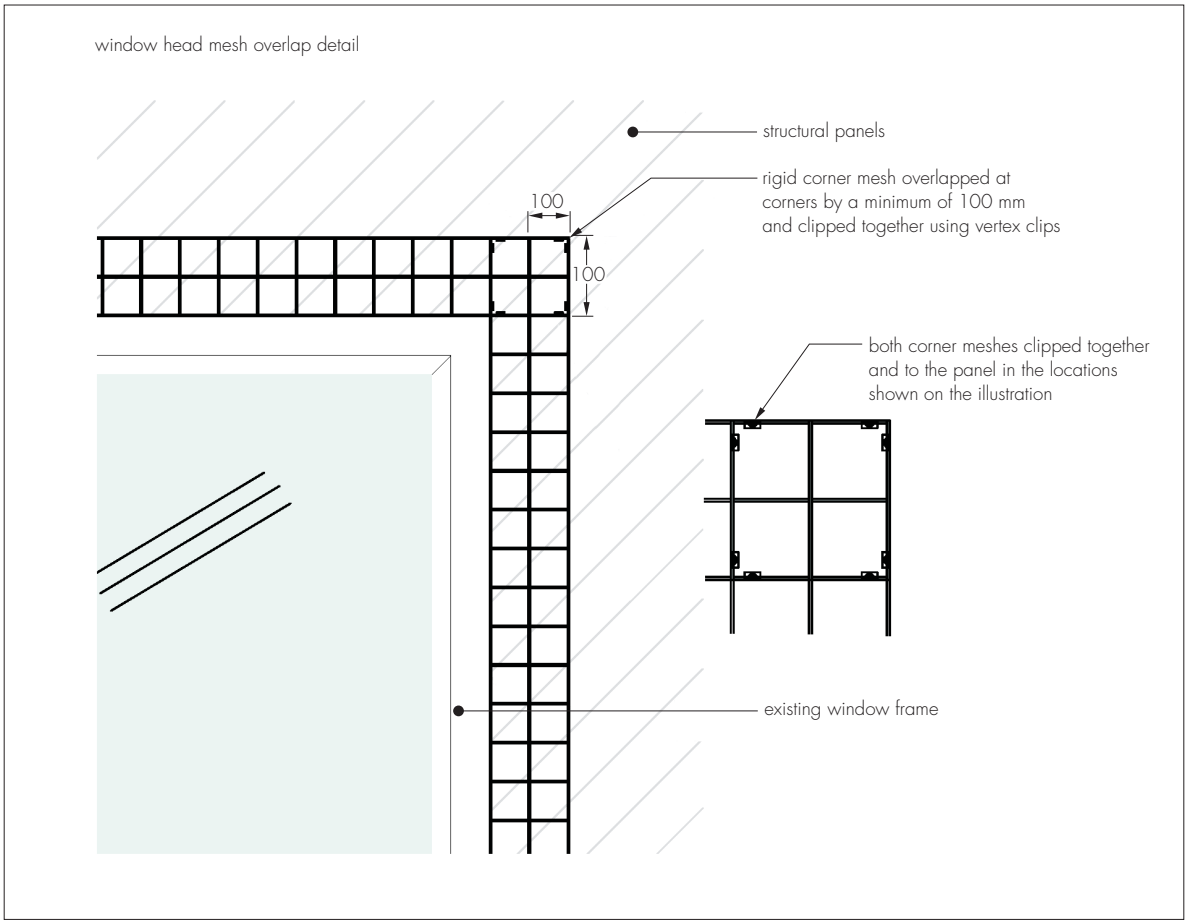
16.20 Prior to the render top coat, a bead of clear silicone sealant is gun-applied at window and door frames, overhanging eaves, gas and electric meter boxes, wall vents or where the render abuts any other building material or surface.

16.21 Corner beads, if required, are fixed to all building corners and to door and window heads and jambs.

16.22 Stop beads are positioned vertically, eg at party wall positions where the adjoining house does not require treatment.

16.23 Rigid corner mesh is applied to all corners to openings and is cut so that the corners overlap one another by a minimum of 100 mm. The laps are then clipped together, and clipped to the panel behind to provide a continuous reinforced corner junction, as shown in Figure 8.

Figure 8 Corner reinforcement



Finishes

16.24 The total thickness of the basecoat and finish must be between 24 mm and 26 mm. Table 9 shows the thicknesses for the various finishes.

Table 9 Thicknesses of finishes

Finish coat	Thickness range
Structherm Dash Receiver	6 to 8 mm
Structherm Spar-Dash Aggregates	6 to 8 mm chips
Structherm Silicone Texture	1.0, 1.2, 1.5, 2.0 mm
Structherm Acrylic Brick-Slips	4 mm
Structherm Acrylic Brick-Slip Adhesive	4 to 5 mm
Structherm Brick-Effect Render	
mortar coat	6 to 8 mm
facing coat	3 to 6 mm (depending on brick joint depth required)

Structherm Spar-Dash Receiver and Aggregates

16.25 For a spar-dash finish, Structherm Dash Receiver is trowel-applied to a thickness of 6 mm to 8 mm. While the dash receiver is still soft, Structherm Spar-Dash Aggregates are thrown or sprayed onto the surface — on completion, the surface must be checked to ensure an even coverage. Where necessary, the aggregate should be lightly tamped to ensure that a good bond is achieved.

Silicone Texture finish

16.26 Silicone primer is applied by roller or brush at 0.2 kg·m^{-2} to 0.3 kg·m^{-2}. The primer must be allowed to dry before application of the finish coat.

16.27 Structherm Silicone Texture finish is supplied ready-to-use although a maximum of 2% potable water can be mixed into the 25 kg tub prior to application.

16.28 The finishes are applied to the thicknesses specified in Table 9, using a stainless steel trowel and finished with a plastic trowel to create a textured finish.

16.29 To prevent the finish from drying too rapidly, it should not be applied in direct sunlight and continuous surfaces should be completed without a break.

Brick-Effect Render finish

16.30 Structherm Brick-Effect Render should be mixed with 4 to 5 litres of potable water per 25 kg bag for a minimum of 5 minutes using an electric paddle mixer to disperse the additives.

16.31 The first (mortar) layer should be applied to the surface of the basecoat using a hawk and trowel or projection render machine to a minimum thickness of 6 mm and ruled off to a flat finish.

16.32 After the mortar layer has started to stiffen, the second layer (brick-face) is applied to an average thickness of 3 mm to 6 mm depending on the brick joint depth required, using a hawk and trowel, or projection render machine.

16.33 The brick face layer should be cut out to the required pattern after it has been shaded and textured. The brick face layer is cut through completely and the mortar layer is cut into slightly using an appropriate bespoke cutting tool. This reproduces recessed mortar coursing of the brickwork as required.

16.34 Following further stiffening of the materials, any face materials left by the cutting out should be lightly brushed and removed using a soft bristled brush.

16.35 The finish must be allowed to thoroughly dry out (48 hours to 1 week, depending on weather conditions).

Acrylic Bricks-Slips

16.36 Structherm Acrylic Brick-Slip Primer is applied by roller or brush. The primer must be dry before application of the acrylic brick-slip adhesive.

16.37 Structherm Acrylic Brick-Slip Adhesive is applied by a 5 mm notch trowel to the entire surface of the primer.

16.38 As brick-slips can be subject to shade variation, they should be selected at random from different boxes.

16.39 Structherm Acrylic Brick-Slips are applied by hand in brick bond fashion, lined and levelled into the adhesive. The brick-slips should be fully encapsulated in adhesive. During application, work should progress from top to bottom lines.

16.40 Joints are normally 10 mm (minimum) wide and when pointing a suitably sized brush is used to smooth out the acrylic adhesive into the joints between the brick-slips and left to dry.

All finishes

16.41 At the tops of walls the systems should be protected by an adequate overhang or by an adequately sealed, purpose-made flashing. Care should be taken in the detailing of the systems around such features as openings, projections and at eaves to ensure adequate protection against water ingress and to limit the risk of water penetrating the systems (see Figures 9 and 10).

Figure 9 Typical window sill

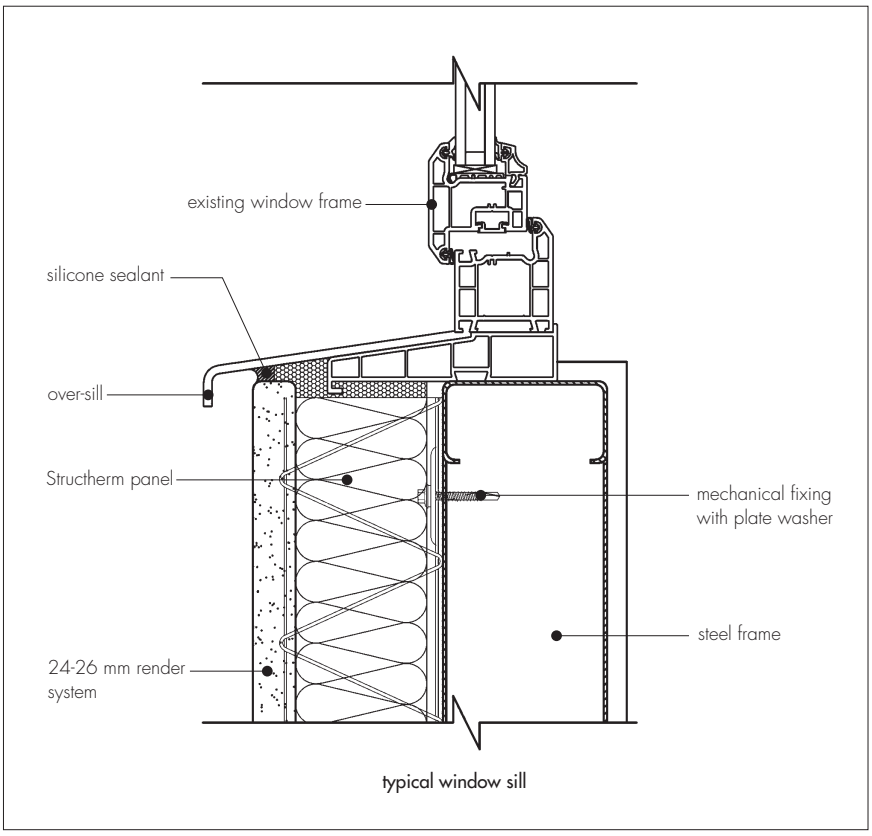
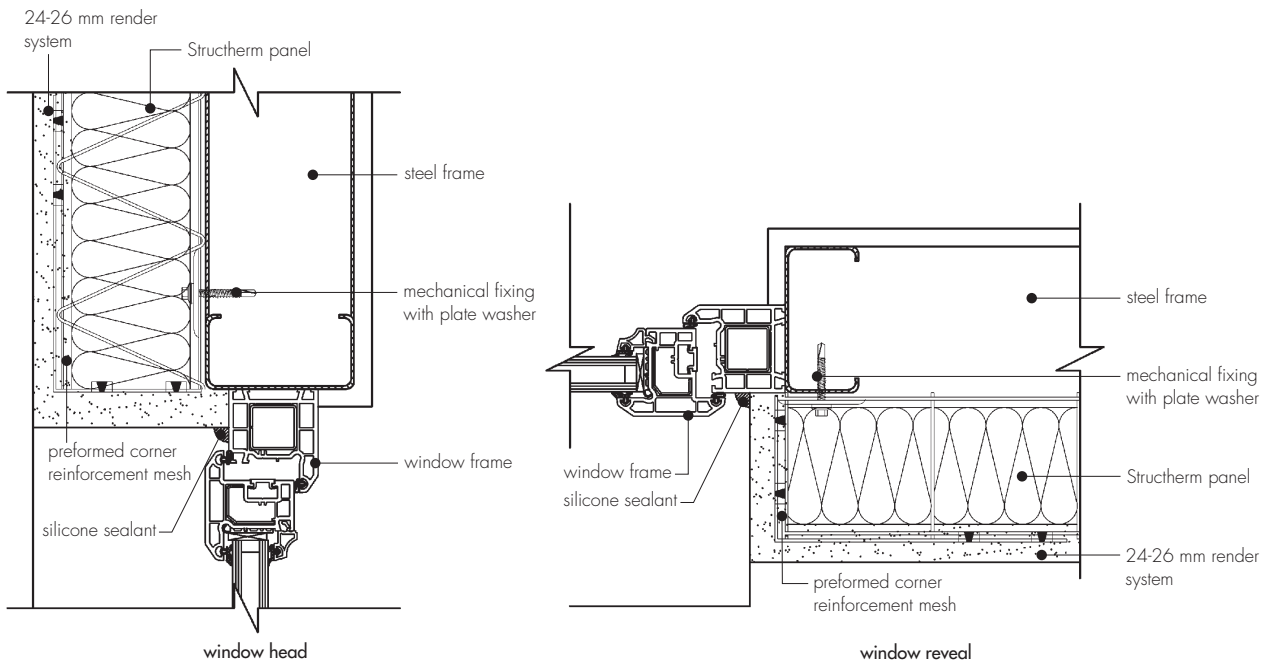


Figure 10 Typical window reveal and head details



16.42 On completion of the installation, external fittings, eg rainwater goods, are securely fixed to timber grounds or extended fixings that have been built into the systems during installation.

Technical Investigations

17 Tests

Tests were carried out to determine:

- heat/spray cycling
- resistance to freeze/thaw
- impact resistance
- water vapour permeability
- fire performance
- durability of finish coatings
- bond strength between basecoat and insulation
- pull-out resistance.

18 Investigations

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

18.2 An assessment of the risk of interstitial condensation was undertaken.

18.3 The adequacy of fixings and durability of finish was checked.

18.4 The practicability of installation and the effectiveness of detailing techniques were examined.

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Conditions of Certificate

Conditions

1. This Certificate:

- relates only to the product 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.

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.

3 This Certificate will be displayed on the BBA website, and the Certificate Holder is entitled to use the Certificate and Certificate logo, provided that the product 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.

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

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

6. Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product which is contained or referred to in this Certificate is the minimum required to be met when the product 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.

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