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Agrément Certificate
13/4977
Product Sheet 5 Issue 1

MAPEI UK EXTERNAL WALL INSULATION SYSTEMS

MAPETHERM MW EXTERNAL WALL INSULATION SYSTEM (LWSF)

This Agrément Certificate Product Sheet(1) relates to the Mapetherm MW External Wall Insulation System (LWSF), comprising mineral wool (MW) insulation slabs, mechanically fixed to sheathed substrates using spacer rails, with a reinforced basecoat and either render or acrylic brick-slip finishes. The system is suitable for use on sheathed steel-framed wall substrates of new and existing domestic or non-domestic buildings. Height restrictions may apply.

(1) Hereinafter referred to as 'Certificate'.

The assessment includes

Product factors:

- compliance with Building Regulations
- compliance with additional regulatory or non-regulatory information where applicable
- evaluation against technical specifications
- assessment criteria and technical investigations
- uses and design considerations

Process factors:

- compliance with Scheme requirements
- installation, delivery, handling and storage
- production and quality controls
- maintenance and repair

Ongoing contractual Scheme elements†:

- regular assessment of production
- formal 3-yearly review

KEY FACTORS ASSESSED

Section 1. Mechanical resistance and stability
Section 2. Safety in case of fire
Section 3. Hygiene, health and the environment
Section 4. Safety and accessibility in use
Section 5. Protection against noise
Section 6. Energy economy and heat retention
Section 7. Sustainable use of natural resources
Section 8. Durability

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

On behalf of the British Board of Agrément

Date of issue: 6 June 2023

Hardy Giesler
Chief Executive Officer

This BBA Agrément Certificate is issued under the BBA's Inspection Body accreditation to ISO/IEC 17020. Sections marked with † are not issued under accreditation.

The BBA is a UKAS accredited Inspection Body (No. 4345), Certification Body (No. 0113) and Testing Laboratory (No. 3537).

Readers MUST check that this is the latest issue of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

The Certificate should be read in full as it may be misleading to read clauses in isolation.

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

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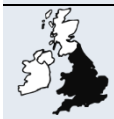
SUMMARY OF ASSESSMENT AND COMPLIANCE

This section provides a summary of the assessment conclusions; readers should refer to the later sections of this Certificate for information about the assessments carried out.

Compliance with Regulations

Having assessed the key factors, the opinion of the BBA is that the Mapetherm MW External Wall Insulation System (LWSF), if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations:



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

Requirement:	**A1**	**Loading**
Comment:		The system can sustain and transmit wind loads to the substrate frame. See section 1 of this Certificate.
Requirement:	**B3(4)**	**Internal fire spread**
Comment:		The system may be restricted by this Requirement. See section 2 of this Certificate.
Requirement:	**B4(1)**	**External fire spread**
Comment:		The system may be restricted by this Requirement. See section 2 of this Certificate.
Requirement:	**C2(b)**	**Resistance to moisture**
Comment:		The system provides a degree of protection against rain ingress. See section 3 of this Certificate.
Requirement:	**C2(c)**	**Resistance to moisture**
Comment:		The system can contribute to minimising the risk of interstitial and surface condensation. See section 3 of this Certificate.
Requirement:	**L1(a)(i)**	**Conservation of fuel and power**
Comment:		The system can contribute to satisfying this Requirement; however, compensating fabric/services measures may be required. See section 6 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The system is acceptable. See sections 8 and 9 of this Certificate.
Regulation:	**7(2)**	**Materials and workmanship**
Comment:		The system may be restricted by this Regulation. See section 2 of this Certificate.
Regulation:	**25B**	**Nearly zero-energy requirements for new buildings**
Regulation:	**26**	**CO_2 emission rates for new buildings**
Regulation:	**26A**	**Fabric energy efficiency rates for new dwellings (applicable to England only)**
Regulation:	**26A**	**Primary energy consumption rates for new buildings (applicable to Wales only)**
Regulation:	**26B**	**Fabric performance values for new dwellings (applicable to Wales only)**
Regulation:	**26C**	**Target primary energy rates for new buildings (applicable to England only)**
Comment:		The system can contribute to satisfying these Regulations; however, compensating fabric/services measures may be required. See section 6 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Fitness and durability of materials and workmanship**
Comment:		The system can contribute to the construction satisfying this Regulation. See sections 8 and 9 of this Certificate.

Regulation:	**8(3)**	**Fitness and durability of materials and workmanship**
Comment:		The system may be restricted by this Regulation. See section 2 of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	1.1	Structure
Comment:		The system can sustain and transmit wind loads to the substrate frame. See section 1 of this Certificate.
Standard:	2.4	Cavities
Comment:		The system may be restricted by this Standard, with reference to clause 2.4.2[(1)(2)]. See section 2 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The system may be restricted by this Standard, with reference to clauses 2.6.4[(1)(2)], 2.6.5[(1)] and 2.6.6[(2)]. See section 2 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The system may be restricted by this Standard, with reference to clause 2.7.1[(1)(2)]. See section 2 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The system can contribute to a construction satisfying this Standard, with reference to clauses 3.10.1[(1)(2)] and 3.10.6[(1)(2)]. See section 3 of this Certificate.
Standard:	3.15	Condensation
Comment:		The system can satisfy the requirements of this Standard, with reference to clauses 3.15.1[(1)(2)], 3.15.4[(1)(2)] and 3.15.5[(1)(2)]. See section 3 of this Certificate.
Standard:	6.1(b)(c)(d)	Energy demand and carbon dioxide emissions
Comment:		The system can contribute to satisfying this Standard, with reference to clauses, or parts of, 6.1.1[(1)], 6.1.2[(2)] and 6.1.6[(1)]; however, compensating fabric/services measures may be required. See section 6 of this Certificate.
Standard:	6.2	Building insulation envelope
Comment:		The system can contribute to satisfying these Standards, with reference to clauses, or parts of, 6.2.1[(1)(2)], 6.2.3[(1)], 6.2.4[(2)], 6.2.5[(2)], 6.2.6[(1)], 6.2.7[(1)], 6.2.8[(2)], 6.2.9[(1)(2)], 6.2.10[(1)], 6.2.11[(1)(2)], 6.2.12[(2)] and 6.2.13[(1)(2)]; however, compensating fabric/services measures may be required. See section 6 of this Certificate.
Standard:	7.1(a)(b)	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. In addition, the system can contribute to a construction meeting a higher level of sustainability as defined in this Standard with reference to clauses 7.1.4[(1)], 7.1.6[(1)(2)], 7.1.7[(1)] and 7.1.9[(2)]. See section 6 of this Certificate.
Regulation:	**12**	**Building standards applicable to conversions**
Comment:		Comments in relation to the system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 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:	**23(1)(a)(i) (iii)(b)(i)(ii)**	**Fitness of materials and workmanship**
Comment:		The system is acceptable. See sections 8 and 9 of this Certificate.

Regulation:	**23(2)**	**Fitness of materials and workmanship**
Comment:		The system may be restricted by this Regulation. See section 2 of this Certificate.
Regulation:	**28(b)**	**Resistance to moisture and weather**
Comment:		The system provides a degree of protection against rain ingress. See section 3 of this Certificate.
Regulation:	**29**	**Condensation**
Comment:		Walls insulated with the system can contribute to satisfy the requirements of this Regulation. See section 3 of this Certificate.
Regulation:	**30**	**Stability**
Comment:		The system can sustain and transmit wind loads to the substrate frame. See section 1 of this Certificate.
Regulation:	**35(4)**	**Internal fire spread – structure**
Comment:		The system may be restricted by this Regulation. See section 2 of this Certificate.
Regulation:	**36(a)**	**External fire spread**
Comment:		The system may be restricted by this Regulation. See section 2 of this Certificate.
Regulation:	**39(a)(i)**	**Conservation measures**
Comment:		The system can contribute to satisfying this Regulation; however, compensating fabric/services measures may be required. See section 6 of this Certificate.
Regulation:	**40(2)**	**Target carbon dioxide emission rate**
Regulation:	**43(1)(2)**	**Renovation of thermal elements**
Regulation:	**43B**	**Nearly zero-energy requirements for new buildings**
Comment:		The system can contribute to satisfying these Regulations; however, compensating fabric/services measures may be required. See section 6 of this Certificate.

Additional Information

NHBC Standards 2023

In the opinion of the BBA, the Mapetherm MW External Wall Insulation System (LWSF), 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)*, Chapters 6.9 *Curtain walling and cladding* and 6.10 *Light steel framed walls and floors*.

Fulfilment of Requirements

The BBA has judged the Mapetherm MW External Wall Insulation System (LWSF) to be satisfactory for use as described in this Certificate. The system has been assessed as an external wall insulation system, used to reduce the thermal transmittance (U value) of external walls of sheathed lightweight-steel-framed structures of new or existing domestic and non-domestic buildings, as described in this Certificate. Height restrictions may apply.

ASSESSMENT

Product description and intended use

The Certificate holder provided the following description for the system under assessment. The Mapetherm MW External Wall Insulation System (LWSF) (see Figure 1) comprises MW insulation slabs, mechanically fixed at 600 mm horizontal centres to the sheathed light gauge steel-framed structure using steel spacer rails (top hat profile) attached to the external surface of a 12 mm (minimum thickness) cement particle board(1) (CPB), creating a 15 mm wide drained cavity. The insulation slabs are covered with a polymer-modified reinforcement basecoat, glass-fibre-reinforcement-mesh, primer (if required) and either render or acrylic brick slip finishes. The system is for application to the outside of sheathed light gauge steel frame buildings, on new or existing domestic and non-domestic buildings.

(1) This is outside the scope of this assessment.

The system build-up combinations covered by this Certificate are specified in Table 1.

Table 1 System components

Insulation	Mapetherm MW Dual Density 036			
Mechanical fixings	Ejot TKR Range screws with a 65 mm diameter polyethylene fixing plate (Ejot SBH-T 65/25)			
Basecoat	Mapetherm AR1 GG			
Reinforcement mesh	Mapetherm Net			
Primer	Quarzolite Base Coat Primer	Silancolor Base Coat Primer	—	—
Finish coat	Quarzolite Tonachino Quarzolite Graffiato	Silancolor Tonachino Silancolor AC Tonachino	—	—
Preparatory layer	—	—	Mapetherm AR1 GG (dash receiver)	Mapetherm AR1 GG (brick slip adhesive)
Aggregate or brick slips	—		Spar Dash Chippings	Mapetherm Acrylic Slips

Further details of the system components are:

Base profile

- Mapetherm BA VT Steel — an aluminium base profile with minimum thickness of 0.8 mm, in 2500 mm lengths with drainage openings

Spacer rails

- Mapetherm Tophat — minimum 48 mm wide galvanized steel top-hat rail profiles with minimum thickness of 0.6 mm. Wider top hat sections can be used provided they have similar or better characteristics and have been approved by the Certificate holder

Mechanical fixings

- Mapetherm base profile/top-hat fixings — self-drilling Ejot Saphir LS Range screws, 5.5 mm diameter by 25 mm length, made of carbon steel with an organic corrosion-resistant finish, used for fastening the base profile or spacer rails to the sheathing board
- Mapetherm Insulation Fixings — self-drilling Ejot TKR Range screws, with 4.8 mm diameter, available in various lengths. Made of case-hardened carbon steel with an organic corrosion-resistant finish and used with a 65 mm diameter polyethylene fixing plate (Ejot SBH-T 65/25) with a central hole to accommodate the TKR range of screws (with adequate lengths to suit the insulation thickness)

Insulation(1)

- Mapetherm MW Dual Density 036 — dual density mineral wool slabs, 1200 by 600 mm, in a range of thicknesses of between 60(2) and 150 mm, with nominal densities of 160/100 kg·m^{-3} (outer/inner layer), a minimum compressive strength of 10 kPa and a tensile resistance perpendicular to the faces of 10 kPa. Slabs are manufactured to comply with the requirements of BS EN 13162 : 2012

(1) For declared thermal conductivity values (λ_D), see section 6.1.
(2) Thicknesses less than 60 mm are available, for use in reveals. See Table 4 for range of thicknesses to achieve fire classification A2-s1, d0.

Basecoat

- Mapetherm AR1 GG — a polymer-modified, cementitious mortar comprising limestone sand, cement, synthetic resins and other additives, supplied as a powder which is prepared by mixing each bag with 5 to 6 litres of clean water. Available in white and grey and can be used as a reinforcement basecoat. For application as a basecoat, it is applied to a thickness of 4 to 7 mm, which results in a coverage rate of 4 to 6 kg·m^{-2}

Reinforcement

- Mapetherm Net — a 1 m wide multi-stranded, woven, alkali-resisting glass-fibre-reinforcement-mesh with a nominal weight of 155 g·m^{-2} and an aperture size of 3.8 to 4.2 mm, supplied in 50 m lengths

Primer

- Quarzolite Base Coat Primer — a coloured, acrylic-resin-based emulsion containing fine quartz particles and binders, for use as a bonding-agent and pre-coat treatment, with a coverage rate of 0.3 to 0.5 kg·m^{-2}
- Silancolor Base Coat Primer — a silicone-resin-based emulsion, for use as a bonding agent and pre-coat treatment, with a coverage rate of 0.1 to 0.15 kg·m^{-2}

Render finishing coats(1)

- Quarzolite Tonachino — a ready to use acrylic-resin-based render available in particle sizes of 0.7, 1.2, 1.5 and 2 mm, to give coverage rates of 1.7 to 2, 1.9 to 2.3, 2.2 to 2.6 and 2.6 to 3 kg·m^{-2} respectively
- Quarzolite Graffiato — a ready to use acrylic-resin-based render available in particle sizes of 1.2 and 1.8 mm, to give coverage rates of 1.9 to 2.3 and 2.4 to 2.8 kg·m^{-2} respectively
- Silancolor Tonachino — a ready to use silicone-resin-based render available in particle sizes of 0.7, 1.2, 1.5 and 2.0 mm, to give coverage rates of 1.7 to 2, 1.9 to 2.3, 2.2 to 2.6 and 2.6 to 3 kg·m^{-2} respectively
- Silancolor AC Tonachino — a ready to use fibre-reinforced acrylic-silicone-resin-based render available with a particle size of 1.2 mm, to give a coverage rate of 1.9 to 2.3 kg·m^{-2}

(1) The applied thickness is regulated by the particle size.

Spar Dash aggregate finish

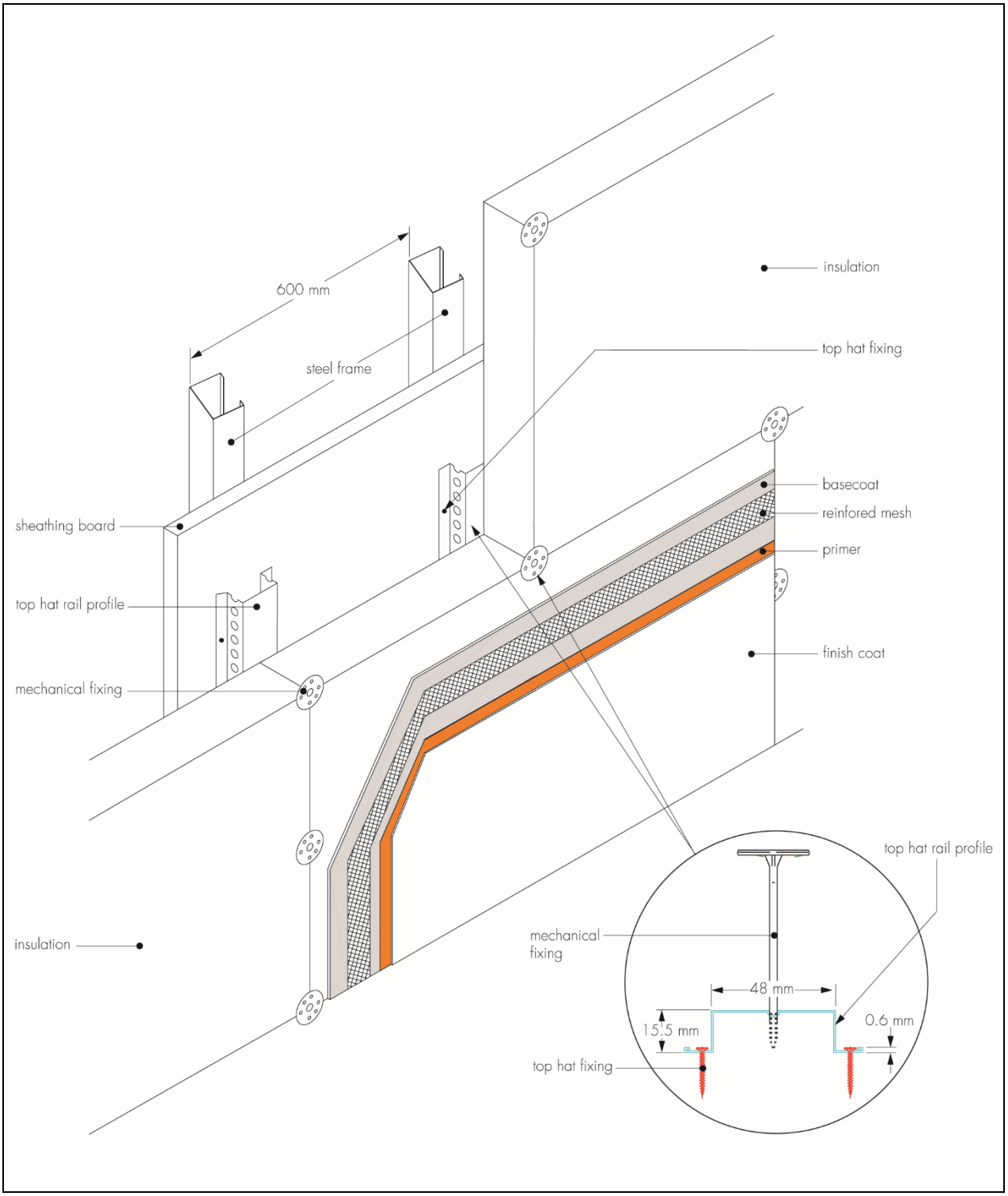
- Mapetherm AR1 GG (dash receiver) — a polymer-modified cementitious dash receiver applied to a thickness of 6 to 8 mm, requiring the addition of 5 to 6 litres of water per 25 kg bag. Available in white and grey, with a coverage rate of 5 to 7 kg·m^{-2}
- Spar Dash Chippings — washed dry-dashing aggregate available in 24 colours, with aggregate sizes of 3 to 8 mm. Full details are available from the Certificate holder

Acrylic brick slip finish

- Mapetherm AR1 GG (brick slip adhesive) — a polymer-modified, cementitious mortar comprising limestone sand, cement, synthetic resins and other additives, supplied as a powder which is prepared by mixing each bag with 5 to 6 litres of clean water. Available in white and grey and applied to a nominal thickness of 5 mm, to give a coverage rate of approximately 5 kg·m^{-2}
- Mapetherm Acrylic Slip — lightweight, pre-coloured and flexible brick-slips, available in a range of sizes, 4 to 6 mm thicknesses and with a coverage rate of approximately 3.5 to 5.3 kg·m^{-2}. Available as straight brick-slips (size 215 by

65 mm), corner full size brick-slips (size 215 by 65 mm facing, with 102.5 by 65 return) and corner three-quarter size brick-slips (size 175 by 65 mm facing, with 115 by 65 return) in standard colours.

Figure 1 The Mapetherm MW External Wall Insulation System (LWSF)



Ancillary items

The Certificate holder recommends the following as ancillary items for use with the system, but these materials have not been assessed by the BBA and are outside the scope of this Certificate:

- a range of aluminium, PVC-U or stainless-steel profiles, comprising:
  - base profile
  - edge profile
  - corner profile with optional PVC-U nosing
  - render stop profile
- LWSF construction, including the sheathing board/breather membrane (supplied by others)
- specialist profiles including parapet capping and flashing section
- profile connectors and fixings
- breather membrane
- insect mesh
- cavity fire stops
- joint sealant and silicone mastic
- polyurethane foam filler
- aluminium or PVC-U movement joint
- aluminium or PVC-U expansion joint
- water drainage deflector channels (for use above openings)
- polyurethane foam used for filling gaps between insulation slabs
- window sills
- fungicidal wash.

Product assessment – key factors

The system was assessed for the following key factors, and the outcome of the assessments is shown below. Conclusions relating to the Building Regulations apply to the whole of the UK unless otherwise stated.

1 Mechanical resistance and stability

Data were assessed for the following characteristics (see sections 9.1.20 to 9.1.25).

1.1 Wind loading

1.1.1 Pull out resistance — the design pull-out resistance of the profile (spacer rail) fixings from the substrate obtained from site tests (N_{RD1}) must not be less than the maximum design wind load (W_e). The characteristic pull-out resistance based on site tests is determined in accordance with the guidance given in EOTA TR051 [characteristic pull-out resistance (N_{RK1}) = 0.6 x mean of 5 lowest test results]. To obtain the site design pull-out resistance of the fixings, the characteristic site pull-out resistance must be divided by the partial factor given in Table 2 of this Certificate for a similar substrate.

1.1.2 The typical characteristic pull-out resistances for the fixings tested on a similar substrate are as per Table 2, and can be used as a reference guide.

Table 2 Typical characteristic pull-out resistances of profile and insulation fixings

Fixing type	Substrate facing	Characteristic pull-out resistance[1] (kN)	Partial factor[2]
Ejot Saphir LS Range self-drilling screws, 5.5 mm diameter	Cement particle board with minimum 12 mm board thickness	0.84	2
Ejot TKR Range self-drilling screws, 4.8 mm diameter	Steel spacer rails (top hat profile)	1.06	1.5

(1) Values obtained from tests.
(2) To obtain the typical design pull-out resistance (N_{RDTyp}) of the fixing, the characteristic pull-out resistance must be divided by the partial factor given.

1.1.3 A dynamic wind uplift (DWU) test was carried out on a sheathed frame building with the following system build up:

- 12 mm cement particle boards (CPB) attached to steel frame building
- vertical steel spacer rails fastened onto CPB, positioned at 600 mm horizontal spacing with screws applied at 300 mm vertical centres in both flanges (staggered on each flange)
- spacer rails provide 15 mm cavity between the sheathing boards and insulation slabs
- insulation slabs were fastened to vertical spacers rails with insulation fixings [Ejot TKR Range screw with a 65 mm diameter polyethylene plate (Ejot SBH-T 65/25)], with the layout and spacing as shown in Figure 5
- basecoat (nominal thickness of 4 mm) applied over the insulation with reinforcing mesh fully embedded
- mineral finish coat (nominal thickness of 1.5 mm) applied over the basecoat.

1.1.4 The maximum design negative wind load that can be resisted by the system, as determined from the DWU test (Rd_{Test}) is equal to 1.14 $kN \cdot m^{-2}$[(1)(2)].

(1) The maximum design wind load that can be resisted by the system corresponds to the maximum allowed spacing and centres of fixings and profiles and as described in section 1.1.3. These fixings and profile configuration will also adequately transfer the system's self-weight, wind and impact loads to a suitable substrate wall.
(2) The characteristic resistance value (N_{RK2}) determined from the DWU test is 2.85 $kN \cdot m^{-2}$. The design wind load resistance is determined by dividing this characteristic resistance value by a partial safety factor of 2.5.

1.1.5 The data derived from sections 1.1.2 and 1.1.3 must be assessed against the design wind load, and the following expressions must be satisfied:

For safe design:

$Rd_{Test} \geq W_e$ and $N_{RD1} \geq W_e$

Calculated using:

$N_{RD1} = N_{RK1}/\gamma m$
$Rd_{Test} = N_{RK2}/\gamma m$

Where:

Rd_{Test} is the negative design 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 based on site tests (kN)
N_{RK1} is the characteristic resistance obtained from the pull-out test
N_{RK2} is the characteristic resistance obtained from the wind uplift test
γ_m is the partial safety factor (determined by the mode of failure).

1.2 Resistance to impact

1.2.1 Hard body impact tests were carried out in accordance with ETAG 004 : 2013 (equivalent to EAD 040083-00-0404). On the basis of the data assessed, the system is suitable for use in the Use Categories up to and including those specified in Table 3 of this Certificate.

Table 3 System hard body impact resistance

System assessed Rendering: basecoat (Mapetherm AR1 GG) + Mapetherm primers and finishing coats as indicated below:	Assessment method	Use Category(1)	
		Mapetherm Net	
		Single layer	Double layer
Quarzolite Base Coat primer + Quarzolite Tonachino Quarzolite Base Coat primer + Quarzolite Graffiato	EAD 040083-00-0404, Section 2.2.8	II	II
Silancolor Base Coat primer + Silancolor Tonachino		II	II
Silancolor Base Coat primer + Silancolor AC Tonachino		II	Not tested
Mapetherm AR1 GG (dash receiver) + Spar Dash Chippings		I	Not tested
Mapetherm AR1 GG (brick slip adhesive) + Mapetherm Acrylic Slips		I	Not tested

(1) The Use Categories are defined in ETAG 004 : 2013 (equivalent to EAD 040083-00-0404) 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 system will limit the size of the impact; or at lower levels where access to the building is primarily to those with some incentive to exercise care
- Category III — a zone not likely to be damaged by normal impacts caused by people or by thrown or kicked objects.

1.2.2 Soft body impact tests were carried out in accordance with EAD 040914-00-0404. The system is suitable for use in all Use Categories as defined in Categorisation Table 6 of EAD 040914-00-0404(1).

(1) System tested at 100, 300 and 500 Nm with no visible damage.

1.3 Behaviour under loading

1.3.1 The system was tested in accordance with a BBA method for combined self-weight and wind actions, to confirm its suitability when using the maximum insulation thickness of 150(1) mm of minimum stiffness, heaviest insulation and render system and by adopting the fixing pattern shown in Figure 5 (minimum number of fixings) using insulation fixing type Ejot TKR Range screws with a 65 mm diameter polyethylene plate (Ejot SBH-T 65/25). It is essential that movement joints, seals and interfaces with the render system are designed and detailed to accommodate all vertical displacements.

(1) This is the maximum thickness that can be specified for the system.

2 Safety in case of fire

Data were assessed for the following characteristics.

2.1 Reaction to fire

2.1.1 The reaction to fire classifications for the system is given in Table 4. The classification and permissible areas of use of other constructions must be established in accordance with the documents supporting the national Building Regulations.

Table 4 Reaction to fire classification

System assessed System build configuration:	Assessment method	Test report	Fire classification
• substrate: Euroclass A1 or A2-s1, d0 with a density of at least 600 kg·m^{-3} • spacer rails: Mapetherm Tophat to create a 15 mm cavity • insulation: Mapetherm MW Dual Density 036 [in a range of thicknesses of between 90(1) and 150 mm inclusive] • mechanical fixings: Mapetherm mechanical fixings (EJOT TKR Range + EJOT SBH-T 65/25) • basecoat: Mapetherm AR1 GG (in grey colour with maximum thickness of 5 mm) • reinforcement: Mapetherm Net • primer: Silancolor Base Coat Primer (in white colour) • finishing coat: Silancolor Tonachino (in 1.5 mm particle size only and in any colour)	BS EN 13501-1 : 2018	Warrington Fire Test Report WF 437377, issue 2 (3 June 2021) and Extended Application Report WF 437376, issue 2 (3 June 2021). A copy is available from the Certificate holder on request	A2-s1, d0
• substrate: Euroclass A1 or A2-s1, d0 with a density of at least 600 kg·m^{-3} • spacer rails: Mapetherm Tophat to create a 15 mm cavity • insulation: Mapetherm MW Dual Density 036 (in a range of thicknesses of between 60 and 150 mm inclusive) • mechanical fixings: Mapetherm mechanical fixings (EJOT TKR Range + EJOT SBH-T 65/25) • basecoat: Mapetherm AR1 GG (either white or grey with nominal thickness of 5 mm) • reinforcement: Mapetherm Net • primer: Quarzolite Base Coat Primer or Silancolor Base Coat Primer • finishing coats: – Silancolor Tonachino (in any colour and with a particle size of 0.7, 1.2 or 2.0 mm) – Quarzolite Tonachino, Quarzolite Graffiato or Silancolor AC Tonachino • decorative finish: – Mapetherm AR1 GG (dash receiver) + Spar Dash Chippings – Mapetherm AR1 GG (brick slip adhesive) + Mapetherm Acrylic Slip(2)			B-s1, d0

(1) Minimum thickness to achieve fire classification of A2-s1, d0. Thicknesses below 90 mm can only achieve B-s1, d0.
(2) The following 12 standard colours are covered: Off-white, Antique, Brandenburg, Dithmarschen, Friesland, Juist, Mecklenburg, Oldenburg, Rotbunt, Sandstein, Sylt and Westerwald.

2.1.2 The MW insulation material in isolation is classified A1 to BS EN 13501-1 : 2018.

2.1.3 The reverse side of the system (insulation facing into the cavity) has a reaction to fire classification of A1 to BS EN 13501-1 : 2018.

2.1.4 Constructions in Table 4 achieving A2-s1, d0 are suitable for use on, or at any distance from a boundary, and without height restrictions.

2.1.5 In England, constructions achieving B-s1, d0 must not be used on residential buildings more than 11 m in height or on buildings with a storey (excluding any storey consisting exclusively of plant rooms) at least 18 m above ground level which contain one or more dwellings, an institution, a room for residential purposes, student accommodation, care homes, sheltered housing, hospitals, dormitories in boarding schools, hotels, hostels and boarding houses.

2.1.6 In Wales, constructions achieving B-s1, d0 must not be used on buildings with a storey (excluding any storey consisting exclusively of plant rooms) at least 18 m above ground level which contain one or more dwellings, an institution, or a room for residential purposes (excluding any room in a hostel, hotel or boarding house), student accommodation, care homes, sheltered housing, hospitals and dormitories in boarding schools.

2.1.7 In Scotland, constructions achieving B-s1, d0 must not be used on buildings with a storey 11 m or more in height or on some entertainment, assembly, hospital and residential care buildings. These constructions must also not be used 1 m or less from a boundary, except on houses. These constructions must also be included in calculations of unprotected area.

2.1.8 In Northern Ireland, constructions achieving B-s1, d0 must not be used on buildings with a storey (excluding any storey consisting exclusively of plant rooms) at least 18 m above ground level and which contains one or more dwellings, an institution, a room for residential purposes (excluding any room in a hostel, hotel or boarding house), student accommodation, care homes, nursing homes, sheltered housing, hospitals, dormitories in boarding schools and places of lawful detention.

2.1.9 For application to second storey walls and above, the designer must consider at least one stainless steel fixing per square metre and fire barriers in line with compartment walls and floors, as given in BRE Report BR 135 : 2013.

2.1.10 NHBC Standards require in all cases that a minimum of one non-combustible fixing through the reinforcement mesh, per square metre or per insulation slab, whichever provides the greater number, must be provided, in addition to the other fixings.

2.1.11 Designers must refer to the documents supporting the national Building Regulations 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.

3 Hygiene, health and the environment

Data were assessed for the following characteristics.

3.1 Water vapour permeability

3.1.1 The water vapour resistance factor (μ) and equivalent air layer thicknesses (s_d) are shown in Table 5.

Table 5 Equivalent air layer thickness (sd) — reinforcement basecoats and finish coats

System assessed	Thickness (mm)	Result s_d (m)(1)	Result (μ)
Mineral wool insulation slab: Mapetherm MW Dual Density 036	60 to 150	—	1(2)
Rendering: Basecoat (Mapetherm AR1 GG) with primer + finishing coats as indicated below:			
Quarzolite Base Coat primer + Quarzolite Tonachino (2 mm) or Quarzolite Graffiato (1.8 mm particle size)	8(3)	0.35	—
Silancolor Base Coat primer + Silancolor Tonachino (2 mm)	8(3)	0.41	—
Silancolor Base Coat primer + Silancolor AC Tonachino (1.2 mm particle size)	7.2(3)	0.28	—
Mapetherm AR1 GG (dash receiver) + Spar Dash Chippings	13(4)	0.41	—
Mapetherm AR1 GG (brick slip adhesive) + Mapetherm Acrylic Slip	12.5(5)	0.41	—

(1) The s_d is only representative of particle size of the finishing coats specified; for other particle sizes, the Certificate holder must be contacted, but such advice is outside the scope of this Certificate.

(2) The water vapour resistance factor (μ value) of the insulation is taken from BS EN ISO 10456 : 2007.

(3) Includes reinforcement mesh embedded in Mapetherm AR1 GG basecoat (applied to a thickness of 6 mm), relevant primer and indicated finish coat with stated particle size.

(4) Primer is not used with dash receiver finish (Mapetherm AR1 GG). Based on basecoat thickness of 6 mm and Mapetherm AR1 GG (dash receiver) thickness of 7 mm.

(5) Includes reinforcement mesh embedded in Mapetherm AR1 GG basecoat (applied to a thickness of 5 mm), followed by brick slip adhesive (5 mm thick layer) and 5 mm thick brick slips embedded into adhesive (approximately 2.5 mm exposed).

3.2 Condensation

The BBA has assessed the system for the risk of interstitial condensation, and the following must be implemented.

3.2.1 Designers must ensure that an appropriate condensation risk analysis has been carried out for all parts of the construction, including openings and penetrations at junctions between the insulation product and windows, to minimise the risk of condensation. The recommendations of BS 5250 : 2021 must be followed.

Interstitial condensation

3.2.2 Walls incorporating the system will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2021, and section 3.1 of this Certificate.

4 Safety and accessibility in use

Not applicable.

5 Protection against noise

Not applicable.

6 Energy economy and heat retention

Data were assessed for the following characteristics.

6.1 Thermal conductivity

Calculations of thermal transmittance (U value) must be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2019, using the insulation manufacturer's declared thermal conductivity (λ_D) value of 0.036 $W \cdot m^{-1} \cdot K^{-1}$.

6.2 Thermal performance

6.2.1 The U value of a completed wall will depend on the selected insulation thickness, fixing method and type and number of fixings, and the insulating value of the substrate and its internal finish. Calculated U values for sample constructions in accordance with the national Building Regulations are given in Table 6 and are based on the thermal conductivities given in section 6.1.

Table 6 Insulation thickness required to achieve typical design U values(1)(2)(3)

U value(4) ($W \cdot m^{-2} \cdot K^{-1}$)	Thickness of insulation (mm)
	Steel frame(5)(6)(7)
	Mapetherm MW Dual Density 036
0.25	140
0.26	130
0.28	120
0.30	110
0.35	90

(1) Wall construction inclusive of 12.5 mm plasterboard (λ = 0.25 $W \cdot m^{-1} \cdot K^{-1}$) and 12 mm CPB ($\lambda$ = 0.23 $W \cdot m^{-1} \cdot K^{-1}$) and with an external render thickness of 8 mm (λ = 1.0 $W \cdot m^{-1} \cdot K^{-1}$).
(2) Steel frame — 100 mm uninsulated lightweight steel frame has been included in the calculation.
(3) Declared thermal conductivity (λ_D) of insulation is as specified in section 6.1. Assumes an air gap correction (ΔU) of 0.01. Based upon incremental insulation thicknesses of 10 mm.
(4) See section 9.1.2.
(5) Spacer rails (top hat profiles) within the cavity with resistance of 0.17 $m^2 \cdot K \cdot W^{-1}$ assumed.
(6) Unventilated cavity, with a ventilation rate of 153.14 mm^2 per linear metre.
(7) Calculations based on a mechanically fixed system that included 7 galvanized steel fixings per m^2 with cross-sectional area of 18.1 mm^2.

6.2.2 Care must be taken in the overall design and construction of junctions with other elements and openings, to minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the national Building Regulations.

7 Sustainable use of natural resources

Not applicable.

8 Durability

8.1 The potential mechanisms for degradation and performance characteristics of the materials used on the system were assessed.

8.2 Specific test data were assessed as shown in Tables 7 to 9.

Table 7 Watertightness – hygrothermal behaviour

System assessed	Assessment method	Requirement	Result
Mapetherm MW External Wall Insulation System (LWSF)	EAD 040089-00-0404, Section 2.2.2.2 Watertightness of the EWIS: Hygrothermal behaviour	– no blistering or peeling of any finishing coat – no detachment of the rendering system – no failure or cracking associated with joints between insulation boards – no cracking allowing water penetration to the insulating layer (normally ≤ 0.2 mm)	Pass

Table 8 Watertightness – freeze-thaw behaviour

System assessed	Assessment method	Requirement	Result
Mapetherm MW External Wall Insulation System (LWSF)	EAD 040089-00-0404, Section 2.2.2.3 Watertightness of the EWIS: freeze/thaw behaviour	– no blistering or peeling of any finishing coat – no detachment of the rendering system – no failure or cracking associated with joints between insulation boards – no cracking allowing water penetration to the insulating layer (normally ≤ 0.2 mm)	Pass

Table 9 Watertightness – water penetration test

System assessed	Assessment method	Requirement	Result
Mapetherm MW External Wall Insulation System (LWSF)	EAD 040089-00-0404, Section 2.2.2.5 Watertightness of the EWIS: simulated driven rain test in accordance with EN 12865 : 2002	No water penetration	Pass

8.3 Service life

8.3.1 Under normal service conditions, the system 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 9 of this Certificate.

8.3.2 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.
8.3.3 The render may become discoloured with time, the rate depending on the 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 provided the coating does not adversely affect the water vapour transmission or fire characteristics of the system. The advice of the Certificate holder must be sought as to the suitability of a particular system, but such advice is outside the scope of this Certificate.

8.3.4 To maintain a high quality aesthetic appearance, it may be necessary to periodically overcoat the building using system-compatible coatings recommended by the Certificate holder and in accordance with BS EN 1062-1 : 2004.

PROCESS ASSESSMENT

Information provided by the Certificate holder was assessed for the following factors.

9 Design, installation, workmanship and maintenance

9.1 Design

General

9.1.1 The design process was assessed, and the following requirements apply in order to satisfy the performance assessed in this Certificate.

9.1.2 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).

9.1.3 For improved thermal/carbon-emissions performance of the structure, the designer must consider additional/alternative fabric and/or services measures.

9.1.4 New walls subject to the national Building Regulations must 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 : 2006 and its UK National Annex
- BS 8000-0 : 2014
- BS EN 10346 : 2015
- BS EN 634-2 : 2007.

9.1.5 New walls not subject to regulatory requirements must also be built in accordance with the Standards identified in section 9.1.4.

9.1.6 Movement joints must 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.

9.1.7 The designer must select a construction appropriate to the local wind-driven rain index, paying due regard to the design detailing, workmanship and materials to be used. The sheathing board must be of a suitable exterior grade with appropriately sealed joints, sealed penetrations, breather membrane 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).

9.1.8 The system must provide a minimum 15 mm wide drained cavity[1][2] between the sheathing board and the insulation slabs. The cavity allows the moisture to drain out and provides limited outside air ingress; however, it is classed as an unventilated cavity in accordance with BS EN ISO 6946 : 2017 and it will not affect the U-value calculation of the wall. Openings should be up to 500 mm^2 per metre of wall length (in the horizontal direction) for vertical air layers. The openings must be kept clean and free of obstructions and must be capable of draining freely.

(1) Horizontal drainage channels, which are placed in the cavity above the opening, must not be used to support the system.
(2) Cavities must not contain electrical cables other than meter tails.

9.1.9 The design of the structural frame of the building, including the sheathing boards, is the responsibility of the building designer and is outside the scope of this Certificate. However, the structural frame (and sheathing-associated fixings) must be structurally adequate and must be designed to resist all permanent and variable load actions applied to the system (see Table 10 for minimum specification relating to sheathing board).

Table 10 Minimum sheathing board requirements

Item	Characteristic	Specifications
Sheathing board[1] (CPB)	12 mm thickness minimum	Manufactured to BS EN 634-2 : 2007, Class 1 Minimum density 600 $kg \cdot m^{-3}$ and a minimum reaction to fire performance of B-s1 d0 to BS EN 13501-1 : 2018

(1) The sheathing board is outside the scope of this Certificate. The board must be of an exterior grade, with the minimum acceptable specification as indicated in the above Table.

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

9.1.11 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.

9.1.12 External pipework and ducts must 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 may advise on suitable fixing methods, but such advice and methods are outside the scope of this Certificate.

9.1.13 The designer must ensure that windows, doors, flashings and other similar items have been specifically designed for use with this type of system; particular attention must be paid to the prevention of water ingress into the system. For example, junctions between the system and window and door openings must avoid creating a direct path that could facilitate the transfer of water from the external surface of the wall into the wall construction or to the internal surface. In addition, opening and penetration details should be designed to deflect water away from the insulation and onto the external face of the wall.

9.1.14 The detailed provisions given in the documents supporting the national Building Regulations when the system is installed in close proximity to certain flue pipes and/or heat-producing appliances must be followed.

Surface condensation

9.1.15 In England and Wales, 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 of this Certificate.

9.1.16 In Scotland, 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.

Resistance to weather

9.1.17 The system will provide a degree of protection against water ingress. However, care must be taken to ensure that substrate walls are adequately weather resistant prior to application of the system. The system must only be installed where there are no signs of dampness on the inner surface of the substrate other than those caused solely by condensation.

9.1.18 Designers and installers must take particular care in detailing around openings, penetrations and movement joints to minimise the risk of water ingress.

9.1.19 The guidance given in BRE Report BR 262 : 2002 must be followed in connection with the weathertightness of solid wall constructions.

9.1.20 At the top of walls, the system must be protected by an adequate overhang or other detail designed for use with this type of system (see Annex A). On flat roofs and parapet walls, waterproofing and drainage must be adequate and in good condition.

Structural performance

9.1.21 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. The Certificate holder must also verify that a suitably experienced and qualified individual (with adequate professional indemnity) establishes that:

- the wind loads on the different zones of the building's elevation for the specific geographical location have been calculated correctly (see section 9.1.22)
- 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 9.1.22 to 9.1.24).

9.1.22 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.

9.1.23 The wind loads on the walls must 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 of the factors affecting wind load on each elevation and specific zones of the building must be considered. In accordance with BS EN 1990 : 2002 and its UK National Annex, a partial factor of 1.5 must be applied to the calculated characteristic wind pressure values to establish the design wind load to be resisted by the system.

9.1.24 Installations correctly designed in accordance with this Certificate will safely accommodate the applied loads due to the self-weight of the system, wind and impact.

9.1.25 Negative wind load is transferred to the substrate wall via:

- the bond between the insulation and the render system or acrylic brick slip finish
- the pull-out resistance of the insulation fixing from the spacer rails (see section 1.1.2)
- the pull-through resistance of the insulation fixing
- the pull-through resistance of the profile fixing from the spacer rails
- the pull-out resistance of the profile fixing from the substrate (see section 1.1.2).

9.1.26 The horizontal local deflection of the supporting structure due to variable loads must be within acceptable limits. The suggested limit for the maximum horizontal local deflection is the height of the storey/360. The Certificate holder must advise on the limiting deflection for the system, in accordance with the UK National Annex to BS EN 1993-1-1 : 2005.

9.2 Installation

9.2.1 Installation instructions provided by the Certificate holder were assessed and judged to be appropriate and adequate.

9.2.2 Installation must be carried out in accordance with this Certificate and the Certificate holder's instructions. A summary of instructions and guidance are provided in Annex A of this Certificate.

9.3 Workmanship

9.3.1 Practicability of installation was assessed on the basis of the Certificate holder's information. To achieve the performance described in this Certificate, the system must only be installed by installers who have been trained and approved by the Certificate holder. Details of Approved Installers are available from 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 requirement 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.

9.4 Maintenance and repair

9.4.1 An initial inspection must be made within 12 months and regularly thereafter to include:

- visual inspection of the render/brick slips for signs of damage. Cracks in the render exceeding 0.2 mm must be repaired
- visual inspection of the brick slips for signs of dislodgement
- 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 or brick slip system
- necessary repairs effected immediately and any 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 frames).

9.4.2 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 : 2016.

10 Manufacture

10.1 The production processes for the system have been assessed and provide assurance that the quality controls are satisfactory according to the following factors:

10.1.1 The manufacturer has provided documented information on the materials, processes, testing and control factors.

10.1.2 The quality control operated over batches of incoming materials has been assessed and deemed appropriate and adequate.

10.1.3 The quality control procedures and testing to be undertaken have been assessed and deemed appropriate and adequate.

10.1.4 The process for management of non-conformities has been assessed and deemed appropriate and adequate.

10.1.5 An audit of each production location was undertaken, and it was confirmed that the production process was in accordance with the documented process, and that equipment has been properly tested and calibrated.

†10.1.6 The BBA has 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.

11 Delivery and site handling

11.1 The Certificate holder stated that the system components are delivered to site in the packaging and quantities listed in Table 11. Each package carries the product identification and batch number.

Table 11 System component supply details

Component	Quantity and package
Base profile – Mapetherm BA VT Steel	2.5 m lengths
Spacer rails – Mapetherm Tophat	2.3 and 4 m lengths
Base profile and spacer rail fixings (Ejot Saphir LS Range)	Boxed by manufacturer
Insulation – Mapetherm MW Dual Density 036	Polythene wrapped
Insulation fixings – Ejot SBH-T 65/25 washer and Ejot self-drilling TKR Range screws	Boxed by manufacturer
Mapetherm AR1 GG (basecoat, dash receiver and brick slip adhesive)	25 kg bags
Reinforcement mesh – Mapetherm Net	50 m rolls, 1 m wide
Primer:	
Quarzolite Base Coat primer	25 kg tubs
Silancolor Base Coat primer	25 kg tubs
Finishing coats:	
Quarzolite Tonachino	25 kg plastic buckets
Quarzolite Graffiato	25 kg plastic buckets
Silancolor Tonachino	25 kg plastic buckets
Silancolor AC Tonachino	25 kg plastic drums
Mapetherm Acrylic Slip	Boxed by manufacturer to cover an area of 3 m^2
Spar Dash Chippings	25 kg bags

11.2 Delivery and site handing must be performed in accordance with the Certificate holder's instructions and this Certificate, including:

11.2.1 The insulation must 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.

11.2.2 The powder and paste components must be stored off the ground in a safe area in dry conditions and protected from moisture and frost. Contaminated material must be discarded.

11.2.3 The other components of the system must be stored in a safe area, under cover and protected from excessive heat and frost at all times.

ANNEX A – SUPPLEMENTARY INFORMATION †

Supporting information in this Annex is relevant to the system but has not formed part of the material assessed for the 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.

CLP Regulations

The Certificate holder has taken the responsibility of classifying and labelling the system under the *GB CLP Regulation* and the *CLP Regulation (EC) No 1272/2008 - classification, labelling and packaging of substances and mixtures.* Users must refer to the relevant Safety Data Sheets.

Management Systems Certification for production

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

Additional information on installation

Installation must be in accordance with the Certificate holder's instructions and this Certificate. A summary of precautions and ancillary system components is provided below:

General guidelines

A.1 Site survey and preliminary work

A.1.1 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 system. A specification is prepared for each elevation of the building indicating:

- cavity barriers
- the position of beads
- detailing around windows, doors and at eaves
- damp-proof course (DPC) level
- exact position of expansion joints, if required
- additional corner mesh and reinforcement, where required
- areas where flexible seal must be used
- any alterations to external plumbing, if required.

A.1.2 The survey should include tests conducted on the walls of the building by the Certificate holder or their approved installers (see section 9.3) to determine the pull-out resistance of the proposed mechanical fixings for the appropriate substrate. An assessment and recommendation are made on the type and number of fixings required to withstand the building's expected wind loading based on calculations using the test data and pull-out resistance (see section 1.1.2).

A.1.3 Surfaces must be sound, clean and free from loose material. The flatness of surfaces must be checked; this may be achieved using a straight edge spanning the storey height. Any excessive irregularities, ie greater than 10 mm in one metre, must be made good prior to installation, to ensure that the insulation slabs are installed with a smooth, in-plane finished surface.

A.1.4 On existing buildings, purpose-made window sills must be fitted to extend beyond the finished face of the system. New buildings must incorporate suitably deep sills (see Figure 10).

A.1.5 In new buildings, internal wet work (eg screed or plastering) must be completed and allowed to dry prior to the application of the system.

A.1.6 All modifications, such as provision for fire stopping and necessary repairs to the building, must be completed before installation commences.

A.2 Installation

A.2.1 Installation of the system must be carried out in accordance with the Certificate holder's current installation instructions and this Certificate.

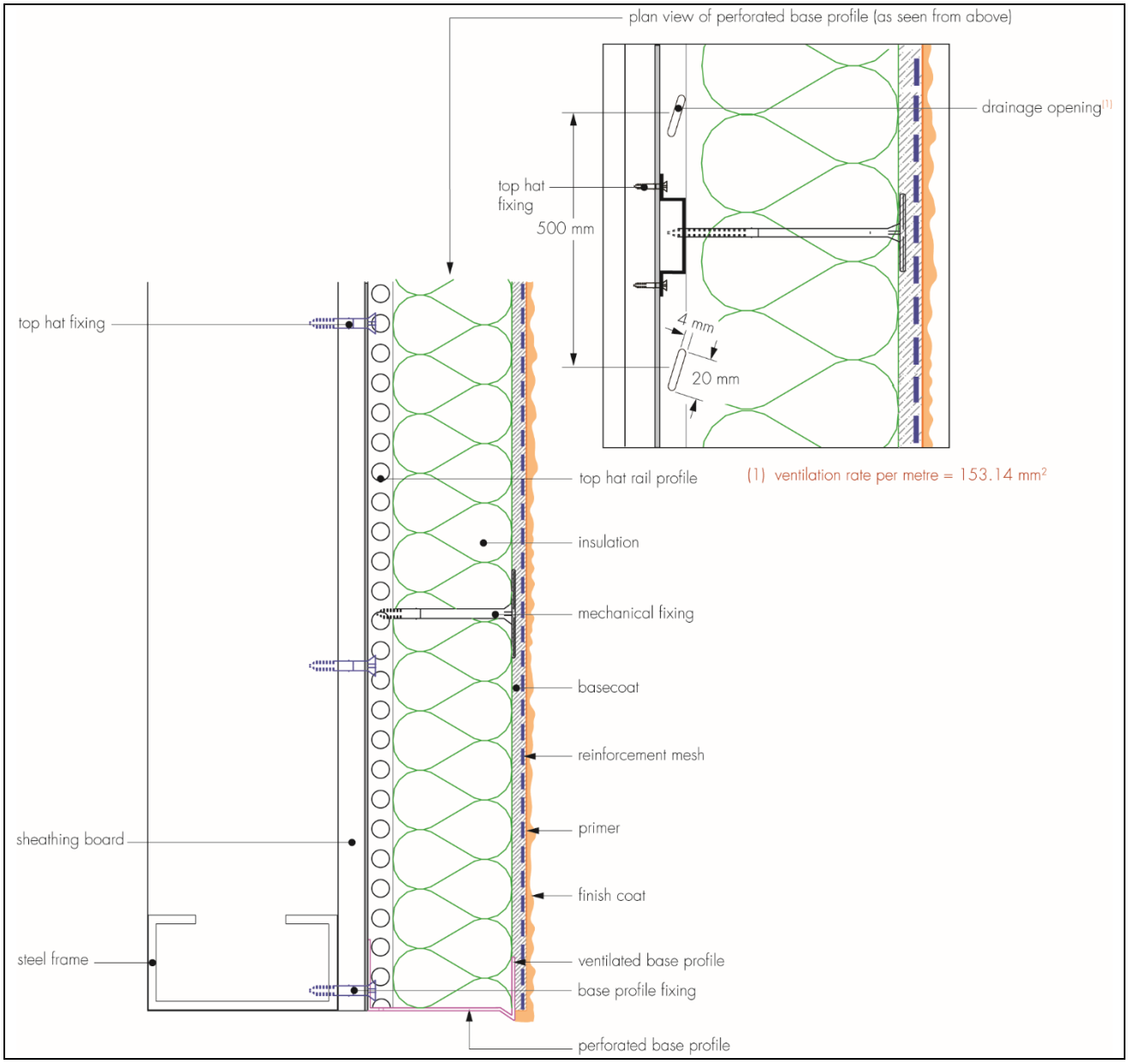
A.2.2 Weather conditions should be monitored to ensure correct application and curing conditions. Application of coating materials must not be carried out at temperatures below 5°C or above 30°C, or if exposure to frost is likely, and the coating must be protected from rapid drying. Installation should not take place during rainfall or if rain is anticipated. In addition, cementitious-based renders must not be applied if the temperature is likely to fall below 0°C.

A.2.3 All rendering must be in accordance with the relevant recommendations of BS EN 13914-1 : 2016. The render must be protected from rapid drying and should not be applied on elevations in direct sunlight or where the substrate is hot.
Positioning and securing insulation slabs

A.2.4 Mapetherm BA VT Steel base profiles are secured to the sheathing boards(1) (CPB) above the DPC (see Figure 2), which are fixed to the sheathing board at 300 mm centres using self-drilling Ejot Saphir LS Range screws. Figure 2 shows the opening details, which are maintained at 500 mm intervals, except the openings at each end, which are positioned at 250 mm from edges, resulting in a ventilation rate of 153.14 mm^2 per metre length. Base profile clips are fixed to the front lip at the base of the joints to aid system extensions. Different clips are used depending on the specified finish; details are available from the Certificate holder, but such advice is outside the scope of this Certificate.

(1) See section 9.1.8 and Table 10.

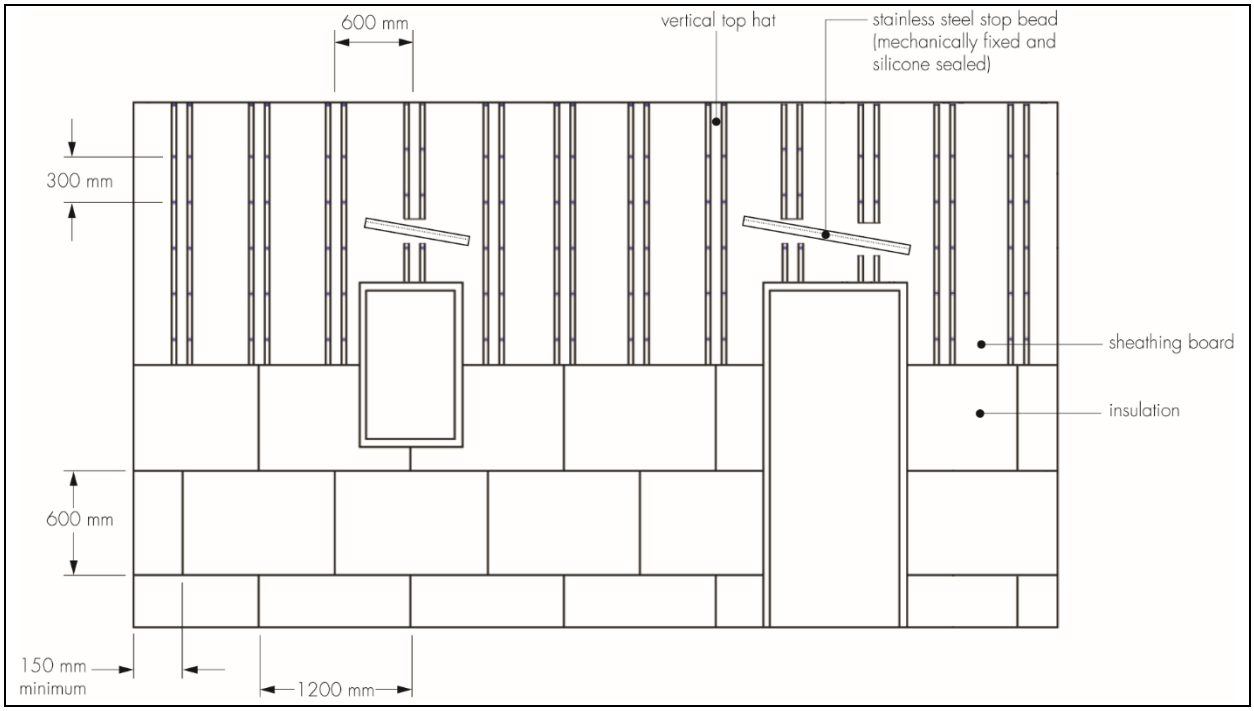
Figure 2 Typical section of base profile



A.2.5 Spacer rails (Mapetherm Tophat) are attached vertically at 600 mm centres in the horizontal direction and mechanically fixed to the sheathing board with self-drilling Ejot Saphir LS Range screws into both sides of the rail flange. The fixings are staggered on each flange at a maximum spacing of 300 mm vertically. Spacer rails must be centred correctly and are true to line and levelled. Deflection bead profiles(1) are mechanically fixed into sheathing boards above all window and door openings (see Figure 3). Intumescent strips(1) are correctly installed by following the Certificate holder's current installation instructions. Care must be taken not to overdrive the fixings.

(1) Outside the scope of this Certificate.

Figure 3 Spacer rail fixing pattern and arrangement of insulation slabs



A.2.6 The first and second insulation slabs are positioned on the base profile, and the edges on the side of the slab aligned centrally with spacer rails, before securing the insulation slabs into the spacer rails using insulation fixings. Subsequent courses of slabs are positioned so that vertical slab joints are staggered and overlapped at building corners. Insulation slabs should be tightly abutted and, where required, any open joints in the insulation must be filled with slivers of insulation.

A.2.7 The fixings are installed at slab joints and within the slab as per the fixing pattern shown in Figure 5, which equates to five fixings per slab and approximately seven fixings per square metre.

A.2.8 Care must be taken to ensure that fixings are not overdriven and that alignment is checked as work proceeds. The surface of the slabs should be smooth without high spots or irregularities. Fire barriers must be installed where required by the national Building Regulations.

A.2.9 Gaps greater than 10 mm should be closed by repositioning the slab or, where appropriate, by cutting slabs to fit.

A.2.10 To fit around details such as doors and windows, insulation slabs may be cut with a sharp knife or a fine-tooth saw. Purpose-made window-sills and seals should be installed to prevent water ingress and to ensure water is shed clear of items bridging the cavity (see Figure 10). Corner profiles are fixed to all building corners and frame rails are fitted to door and window heads and jambs (see Figure 7).

A.2.11 Installation continues until the whole wall is completely covered including, where appropriate, the building soffits.

Movement joints

A.2.12 The system should incorporate provision for movement joints, where required (see Figure 4).

A.2.13 Expansion beads are fixed horizontally or vertically through the system in predetermined positions, according to the installation specification and the individual requirements of each project.

Figure 4 Vertical movement joint

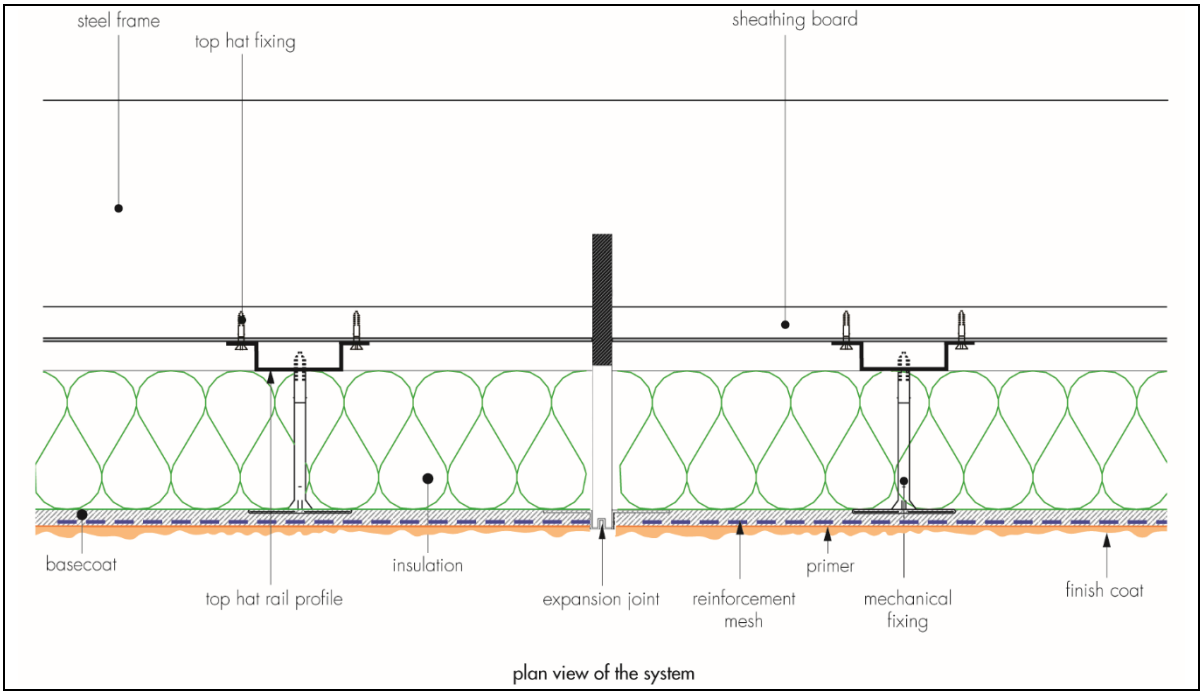
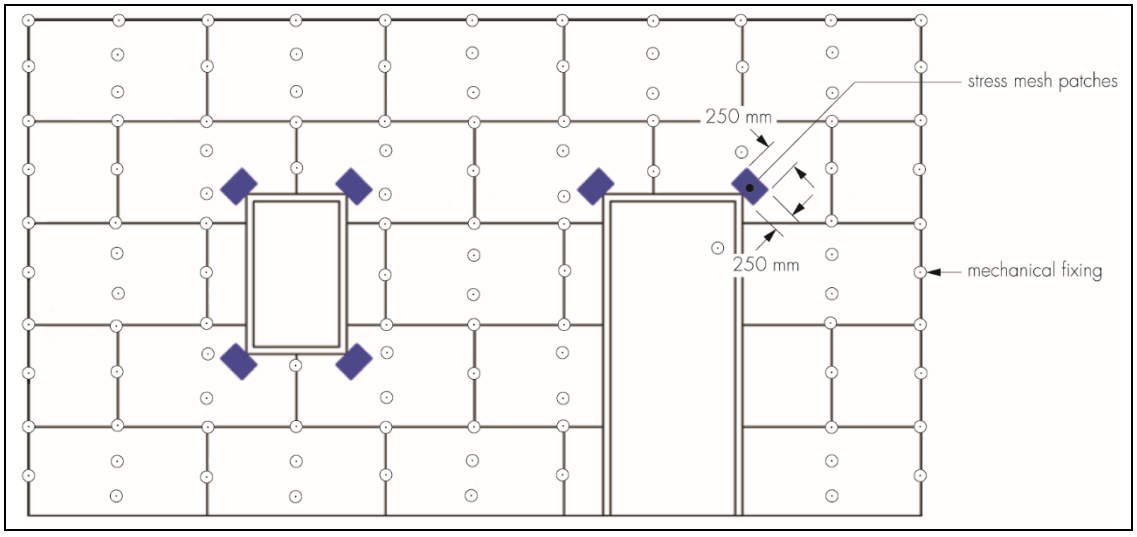


Figure 5 Mechanical fixing pattern and additional reinforcement around openings



Application of basecoat and reinforcement mesh

A.2.14 Prior to the application of the reinforcement mesh and basecoat, pre-compressed sealing tape is secured 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, with the addition of a silicone seal. Alternatively, proprietary sealing beads can be used in accordance with the Certificate holder's instructions.

A.2.15 The basecoat is prepared by mixing each bag with the required amount of clean water in a suitable container, and thoroughly mixing for at least five minutes using a paddle mixer to create a paste-like mortar in accordance with the Certificate holder's instructions.

A.2.16 To provide the necessary reinforcement, stress patches of the mesh (approximate size 250 by 250 mm) are applied with basecoat, diagonally over the insulation slabs at the corners of openings (see Figure 5), before the full layer of mesh is applied (as described in A.2.17).

A.2.17 Basecoat is applied over the insulation slabs using a stainless steel trowel (use of a notched trowel is recommended to maintain the correct depth), and floated with a Darby float to a thickness of between 3 and 5 mm. The reinforcement mesh (with its concave surface to the wall) is applied and is immediately embedded into the basecoat by trowelling from the centre to the edge; an additional light coat of basecoat is applied (whilst the first coat is still wet) to ensure the mesh is free of wrinkles.

A.2.18 Further basecoat to a thickness of 1 to 2 mm is then applied, to ensure the mesh is completely covered and the required minimum thickness of basecoat is achieved, whilst ensuring that the mesh is placed in the top one third of basecoat. The overall thickness of the reinforced basecoat must be greater than 4 mm.

A.2.19 The basecoat is applied progressively, working in one metre sections horizontally or vertically. Overlapping at all mesh joints should not be less than 100 mm.

A.2.20 PVC meshed corner beads are bedded into the basecoat around openings and external corners, as required.

A.2.21 For areas requiring extra resistance to impact, two mesh layers are applied in two stages, in accordance with sections A.2.17 to A.2.19.

A.2.22 Continuous surfaces should be completed without a break. Once the whole wall is completed, the reinforced basecoat is left to dry thoroughly before the application of primer and the finish coat. The drying time will depend upon the conditions, but at least 48 hours should elapse.

Primer(1)

A.2.23 After the basecoat has dried, the primer coat can be roller-applied, sprayed or applied with a long-hair brush, first making sure the basecoat is free from any irregularities (trowel-marks, exposed mesh, etc). It is recommended that the colour of the primer corresponds to the colour of the finish coat. The primer drying time will depend upon the conditions, but at least 12 hours should elapse.

(1) All Mapetherm liquid primers can be applied by brush, roller or spray.

Finish coat

A.2.24 Once the primer is thoroughly dry, the finish coat can be applied.

A.2.25 The render finishes are applied to the required thicknesses as regulated by the particle size (see 'Render finishing coats' under Product description), using a stainless steel trowel and finished with a plastic trowel to create a textured finish. The drying time depends on conditions, but at least 24 hours should elapse before a decorative coating is applied.

A.2.26 Prior to setting, the render is polished with a plastic float to give an even texture and to remove all trowel lines. Elevations should be completed in one application and finished to natural breaks in the render, ie beads or building corners. The texture should be checked to ensure the same batches are applied to each elevation; containers can be batch-mixed to ensure colour consistency and workability.

A.2.27 Once the render finish coat is dry, silicone sealant is installed at all openings (eg windows and doors), overhanging eaves (see Figure 6) and parapets, gas and electric meter boxes, wall vents or where the render abuts any other building material or surface.

Mapetherm AR1 GG dash aggregate finish

A.2.28 For application of Spar Dash aggregate finish, dash receiver (Mapetherm AR1 GG) is applied over the reinforced basecoat to a thickness of between 6 and 8 mm, to achieve a total thickness of 10 to 15 mm (prior to application of the aggregates). While the dash receiver is still soft, Spar Dash aggregate of an appropriate size is applied with a small hand-shovel or specific dash application tool onto the receiver coat. On completion, the surface must be checked to ensure an even coverage of Spar Dash aggregate has been achieved. Where necessary, the aggregate should be lightly tamped to ensure a good bond is achieved.

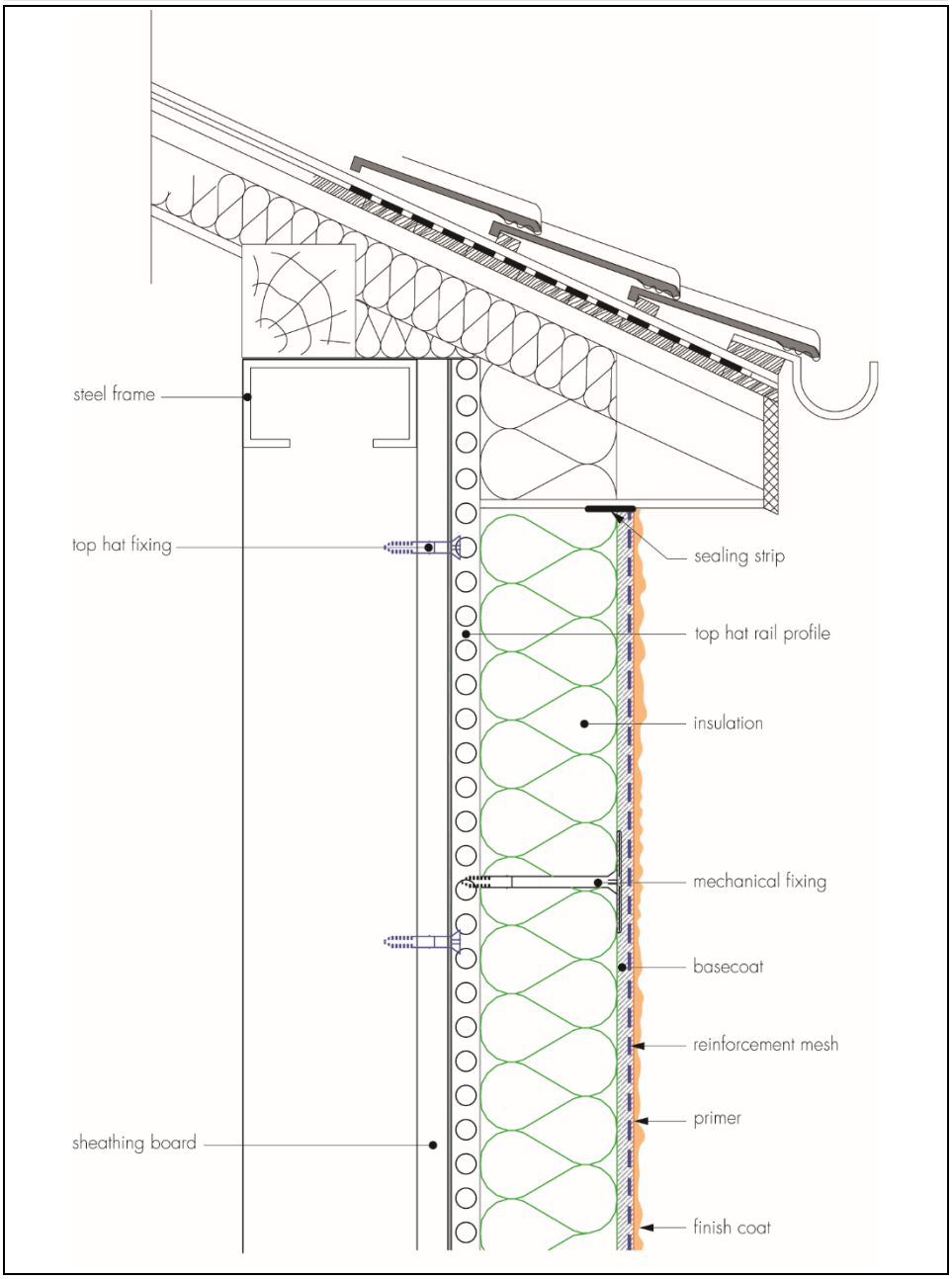
Mapetherm acrylic brick slip finish

A.2.29 Brick slip adhesive (Mapetherm AR1 GG) is applied over the basecoat vertically with a 5 mm notched trowel (to achieve an approximate thickness of 5 mm). A maximum of one-metre-square should be applied at any one time to ensure good adhesion and workability.

A.2.30 Acrylic Brick slips are placed by hand (60 per m^2) on top of the adhesive, leaving an 8 to 12 mm wide joint between the brick-slips, and pressed into position. They should be fully encapsulated in adhesive, paying particular attention to external corners, reveals and edges (to prevent water ingress behind the brick-slips).

A.2.31 A suitably sized damp brush is used to smooth out the adhesive over the joints before the adhesive has set. The adhesive is left to dry.

Figure 6 Roof eaves details



A.2.32 Continuous surfaces must be completed without a break, and the coatings must always be applied to a wet edge.

A.2.33 Care should be taken in the detailing of the systems around such features as openings, projections, eaves and parapets (see Figures 7 to 10), to ensure adequate protection against water ingress and to limit the risk of water penetration.

A.2.34 On completion of the installation, external fittings, eg rainwater goods, are securely fixed to steel grounds or extended fixings that have been built into the systems during installation.

Figure 7 Corner details

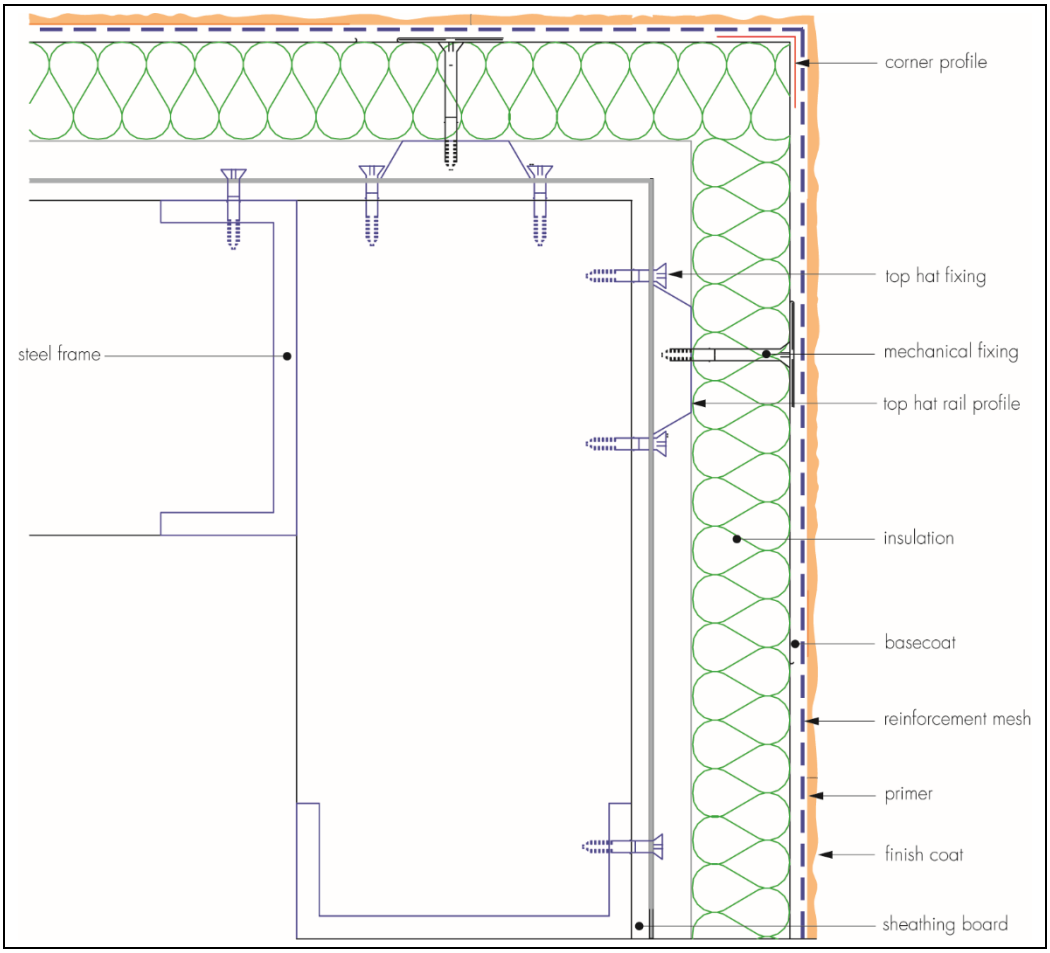


Figure 8 Typical detail at window head details

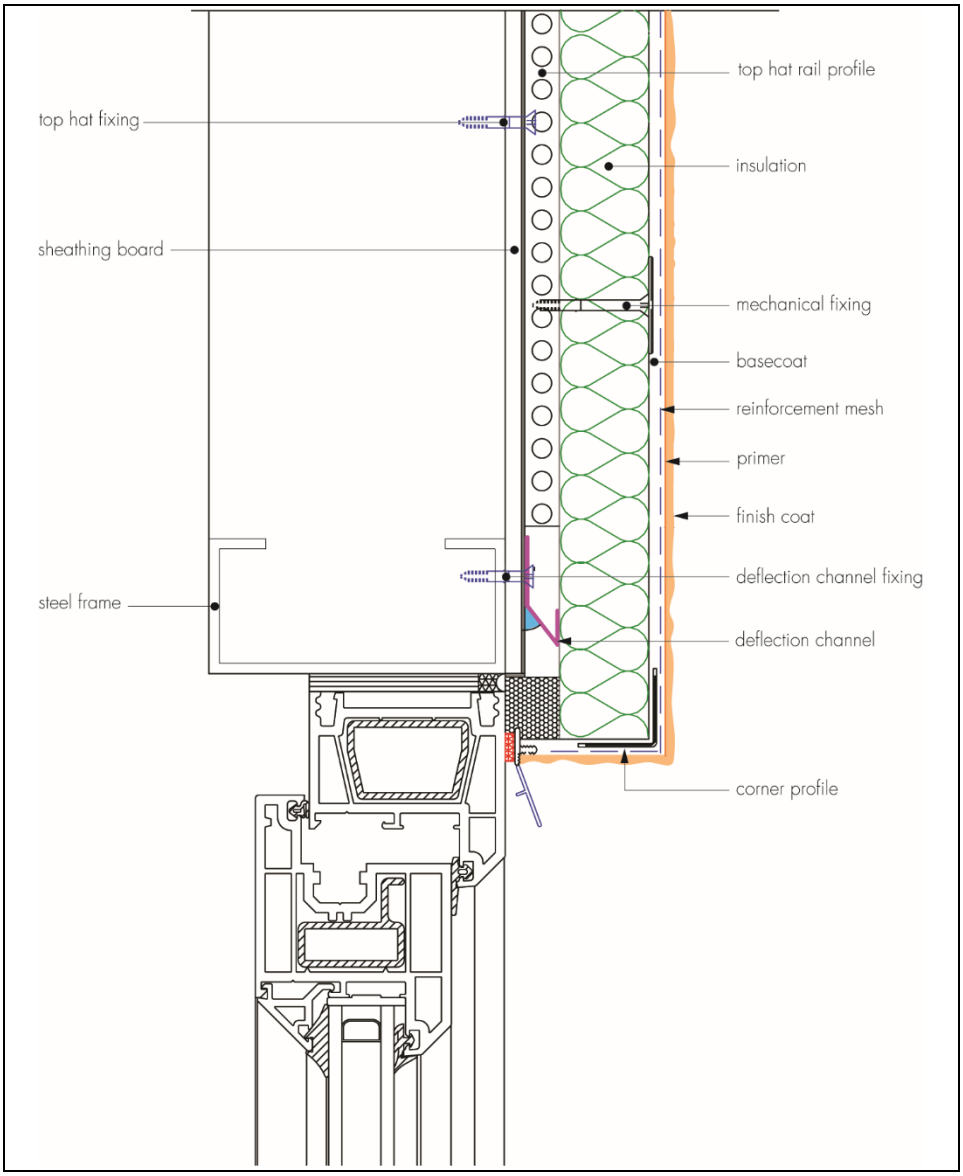


Figure 9 Typical window and door details

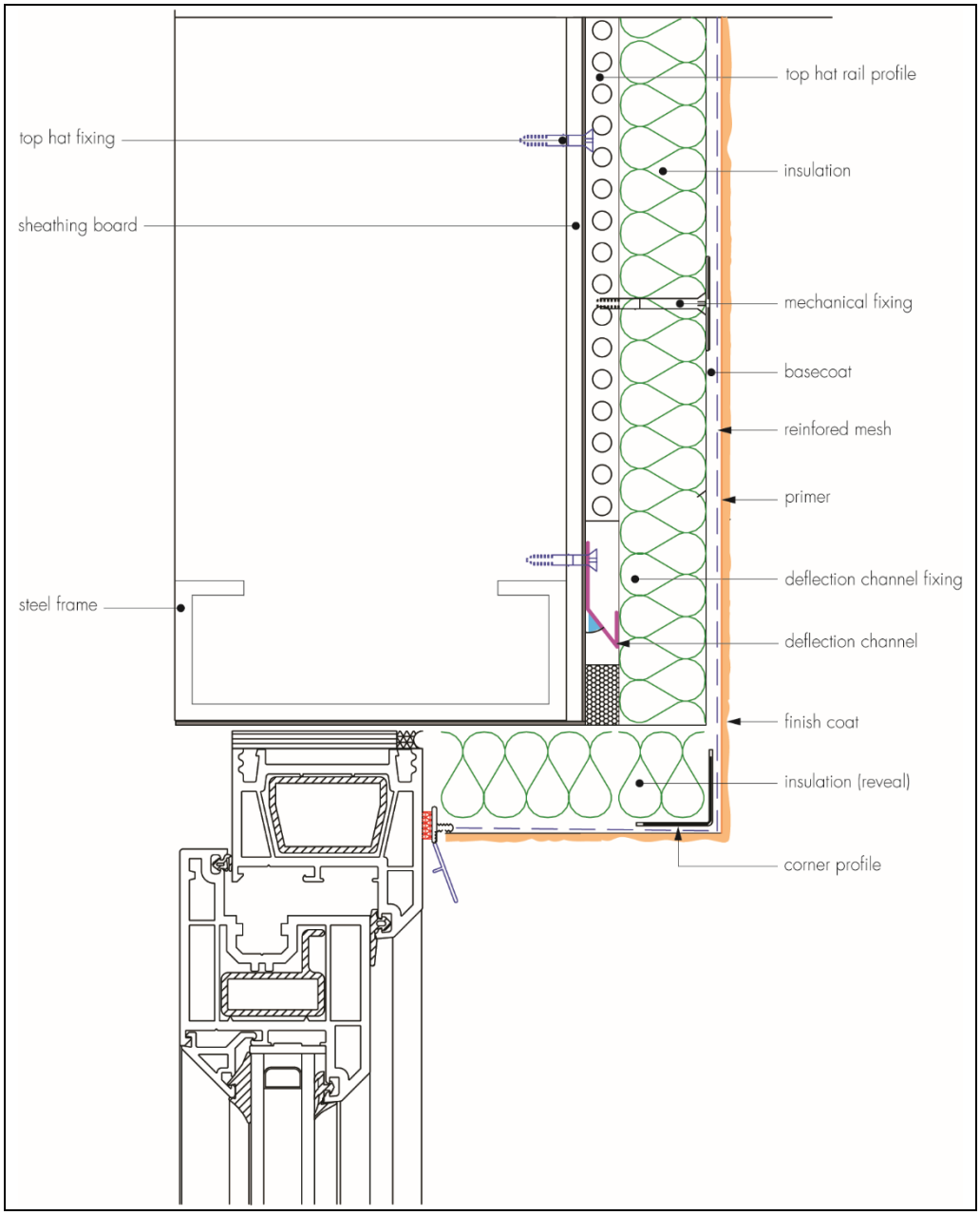
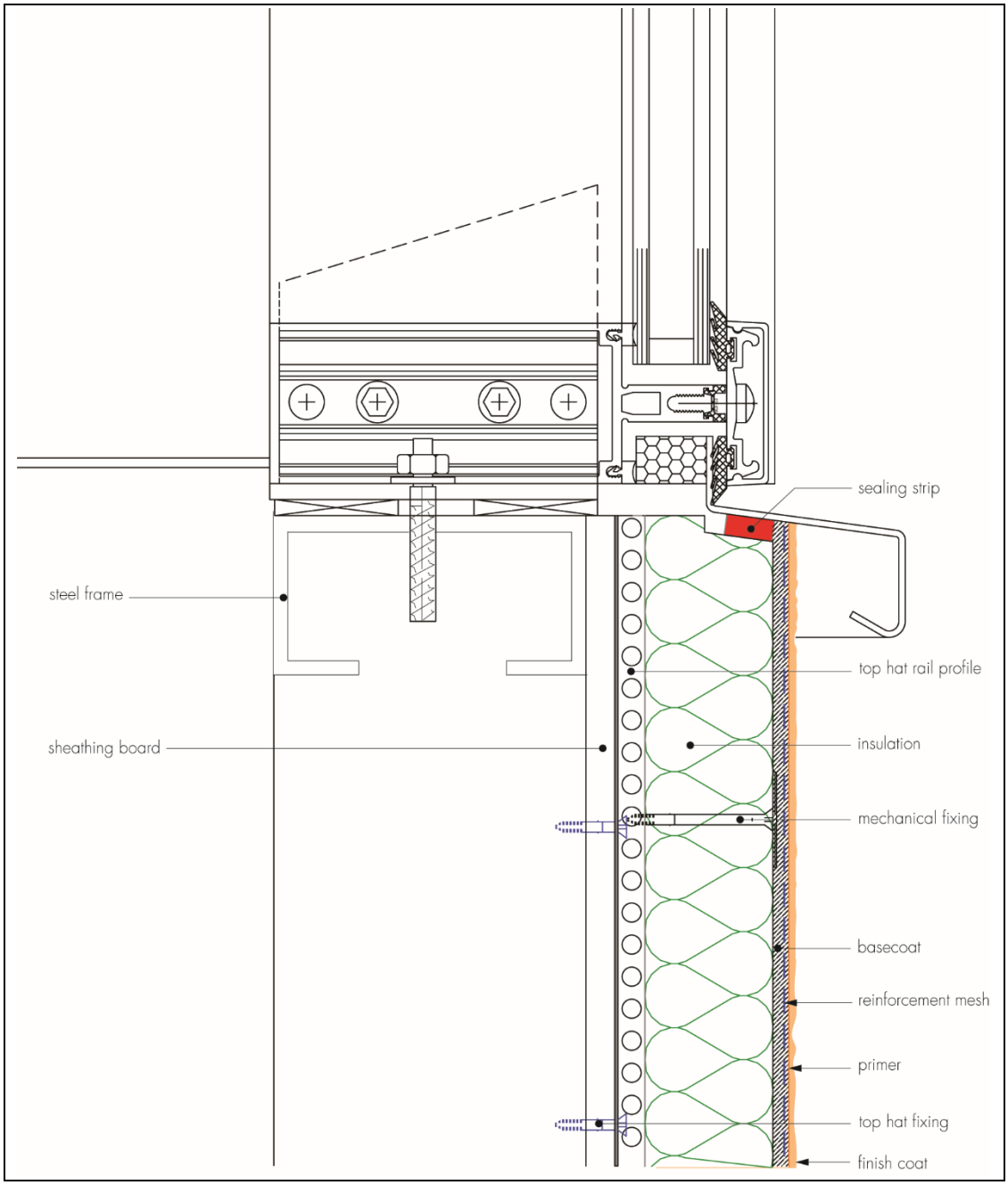


Figure 10 Window sill details



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- are reviewed by the BBA as and when it considers appropriate.

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