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Agrément Certificate

19/5710

Product Sheet 1

EQC ROOF SYSTEMS

EQC SEAM ALUMINIUM STANDING SEAM ROOF SYSTEMS

This Agrément Certificate Product Sheet⁽¹⁾ relates to EQC Seam Aluminium Standing Seam Roof Systems, comprising interlocking profiled sheets, insulation and accessories for fixing to steel or timber purlins and structural decking on roofs with a finished fall from 1° to 70° or a minimum self-curve radius of 45 metres convex, 50 metres concave.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

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

KEY FACTORS ASSESSED

Structural performance — the roof systems will remain structurally stable and deflections will not be excessive under normal service conditions if installed in accordance with the requirements of this Certificate (see section 6).

Weathertightness — the roof systems will resist the passage of wind-driven rain and snow when installed in accordance with the provisions of this Certificate (see section 7).

Thermal performance — the roof systems can provide sufficient insulation to contribute to enabling a building to meet the requirements of the national Building Regulations (see section 8).

Condensation — the likelihood of condensation forming under normal service conditions is negligible (see section 9).

Air permeability — the roof systems will remain reasonably airtight provided that the sealing of the liner and vapour control layer (where required) is maintained and other building elements have incorporated appropriate design details and building techniques to limit air permeability to the building envelope (see section 10).

Performance in relation to fire — the Certificate holder has not declared a resistance to external fire exposure for the roof system and their use is restricted in some cases (see section 11).

Durability — durability depends on the location, environment and coatings used (see section 14).



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: 23 March 2022

Hardy Giesler
Chief Executive Officer

The BBA is a UKAS accredited certification body – Number 113.

The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk
Readers MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

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Regulations

In the opinion of the BBA, EQC Seam Aluminium Standing Seam Roof Systems, 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 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 will have sufficient strength and stiffness to sustain and transmit the design loads in accordance with section 6 of this Certificate.
Requirement:	B3(2)	Internal fire spread (Structure)
Comment:		The systems are restricted by this Requirement in some cases. See sections 11.1, 11.2 (Wales only) and 11.6 of this Certificate.
Requirement:	B3(4)	Internal fire spread (Structure)
Comment:		The systems are restricted by this Requirement. See section 11.5 of this Certificate.
Requirement:	B4(2)	External fire spread
Comment:		The systems are restricted by this Requirement in some cases. See sections 11.1, 11.2 (Wales only) and 11.3 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		When subjected to the maximum design load given in this Certificate, the systems will resist the passage of moisture to the inside of the building. See section 7 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The systems will have a minimal risk of surface condensation or damage due to interstitial condensation. See sections 9.1, 9.2, 9.4 and 9.5 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The systems are acceptable. See sections 8.1 to 8.3 and 10.1 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The systems are acceptable. See sections 14.1 to 14.6 and the <i>Installation</i> part of this Certificate.
Regulation:	26	CO₂ 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)
Comment:		The systems can contribute to satisfying the requirements of these Regulations, although compensating fabric and/or services measures may be required. See sections 8.1 to 8.3 and 10.1 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 the requirements of this Regulation. See sections 13 and 14.1 to 14.6 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	1.1(a)(b)	Structure

Comment:		The systems have sufficient strength and stiffness to transmit the design loads, with reference to clause 1.1.1 ⁽¹⁾⁽²⁾ , in accordance with section 6 of this Certificate.
Standard:	2.1	Compartmentation
Standard:	2.2	Separation
Standard:	2.3	Structural protection
Comment:		The systems are restricted by these Standards, with reference to clauses 2.1.15 ⁽²⁾ , 2.2.7 ⁽²⁾ , 2.2.10 ⁽¹⁾ and 2.3.5 ⁽¹⁾⁽²⁾ . See sections 11.1 and 11.6 of this Certificate.
Standard:	2.4	Cavities
Comment:		The systems are restricted by this Standard, with reference to clause 2.4.2 ⁽¹⁾⁽²⁾ . See section 11.5 of this Certificate.
Standard:	2.8	Spread from neighbouring buildings
Comment:		The systems are restricted under this Standard, with reference to clause 2.8.1 ⁽¹⁾⁽²⁾ . See sections 11.1 and 11.3 of this Certificate.
Standard:	3.10	Precipitation
Comment:		When subjected to the maximum design load given in this Certificate, the systems will resist the passage of moisture to the inside of the building, with reference to clause 3.10.1 ⁽¹⁾⁽²⁾ . See section 7 of this Certificate.
Standard:	3.15	Condensation
Comment:		The systems will have a minimal risk of surface condensation or damage due to interstitial condensation, with reference to clauses 3.15.1 ⁽¹⁾ , 3.15.2 ⁽¹⁾ , 3.15.3 ⁽¹⁾ and 3.15.4 ⁽¹⁾ . See sections 9.4 and 9.5 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Comment:		The systems can contribute to satisfying this Standard, with reference to clauses 6.1.1 ⁽¹⁾ , 6.1.2 ⁽²⁾ and 6.1.6 ⁽¹⁾ although compensating fabric/services measures may be required. See sections 8.1 to 8.3 of this Certificate.
Standard:	6.2	Building insulation envelope
Comment:		The systems can contribute to satisfying clauses, or parts of, 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽¹⁾⁽²⁾ , 6.2.5 ⁽²⁾ and 6.2.6 ⁽²⁾ . See sections 8.1 to 8.3 and 10.1 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. See sections 8.1 to 8.3 and 10.1 of this Certificate.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



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

Regulation:	23(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)	The systems are acceptable. See sections 14.1 to 14.6 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		When subjected to the maximum design load given in this Certificate, the systems will resist the passage of moisture to the inside of the building. See section 7 of this Certificate.
Regulation:	29	Condensation
Comment:		The risk of harmful effects on the building due to interstitial condensation within the systems will be minimal. See section 9.5 of this Certificate.

Regulation:	30	Stability
Comment:		The systems have sufficient strength and stiffness to sustain and transmit the design loads in accordance with section 6 of this Certificate.
Regulation:	35(2)	Internal fire spread — Structure
Comment:		The systems are restricted under this Regulation. See sections 11.1, 11.2 and 11.6 of this Certificate.
Regulation:	35(4)	Internal fire spread – Linings
Comment:		The systems are restricted under this Regulation. See section 11.5 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		The systems are restricted by this Regulation in some cases. See sections 11.1 to 11.3 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Comment:		The systems can contribute to satisfying this Regulation. See sections 8.1 to 8.3 and 10.1 of this Certificate.
Regulation:	40(2)	Target carbon dioxide emission rate
Comment:		The systems can contribute to satisfying this Regulation. See sections 8.1 to 8.3 and 10.1 of this Certificate.

Construction (Design and Management) Regulations 2015

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

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

See sections: 3 *Delivery and site handling* (3.1 and 3.2), 13 *Maintenance* (13.1) and 16 *General* (16.3) of this Certificate.

Additional Information

NHBC Standards 2022

In the opinion of the BBA, EQC Seam Aluminium Standing Seam Roof Systems, 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 7 *Roofs*, Chapter 7.1 *Flat Roofs, Terraces and Balconies* and 7.2 *Pitched Roofs*.

CE marking

The Certificate holder has taken the responsibility of CE marking the following components of the systems:

- EQC Seam profiled aluminium roof sheet, steel and aluminium liner sheets in accordance with harmonised European Standard BS EN 14782 : 2006.
- Quattro bar, brackets and SS110 halters in accordance with European Technical Assessment 13/0698.

All other components within Elect Guaranteed Systems supplied via Euro Quality Cladding Ltd are CE marked by the supplier where required:

- insulation — mineral wool to BS EN 13162 : 2012
- vapour control layers (VCL) to BS EN 13984 : 2013
- structural deck to BS EN 1090-1 : 2009 and BS EN 1090-2 : 2018.

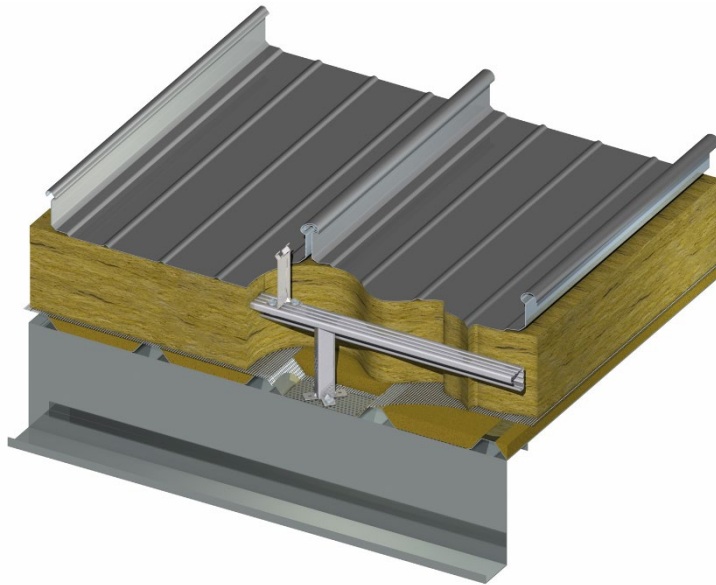
1 Description

1.1 EQC Seam Aluminium Standing Seam Roof Systems consist of coverings of interlocking profiled coated and uncoated aluminium sheets, attached to the roof substructure by stainless steel or aluminium halter. The seams of adjacent sheets are rolled over the halter heads to secure them without penetration of the outer sheet. The halters are mechanically fixed to the Quattro bar and bracket support system which, in turn, is attached by mechanical fasteners either directly to the roof purlins or mounted on top hat sections fixed to structural decking or timber structures. Halter may also be attached directly to suitable structural plywood (18 mm minimum thickness), timber or OSB decking. The systems also comprise insulation and accessories for fixing to steel or timber purlins and structural decking on roofs with a finished fall from 1 to 70°. The sheets can be manufactured with convex and concave curves, or tapered. The sheets can be installed with a minimum self-curved radius of 45 metres convex, 50 metres concave. Access for maintenance and repair, if required, should be considered during the design process.

1.2 The systems covered by this Certificate are shown below (Figures 1 to 6):

Construction type	Description (outside to inside)
<i>Figure 1 System 4 — over purlins — EQC Seam with Quattro bar and bracket and liner</i>	
	• EQC Seam interlocking profiled sheet (see section 1.3 and Figure 7) • SS110 halter (see section 1.4 and Figure 8) • Insulation (see section 1.6) • Quattro bar and bracket (see section 1.5 and Figure 9) • Liner sheet (outside the scope of this Certificate)
	System reference (Quattro bracket height) 4.15 (260 mm), 4.16 (240 mm) 4.18 (220 mm), 4.24 (150 mm).

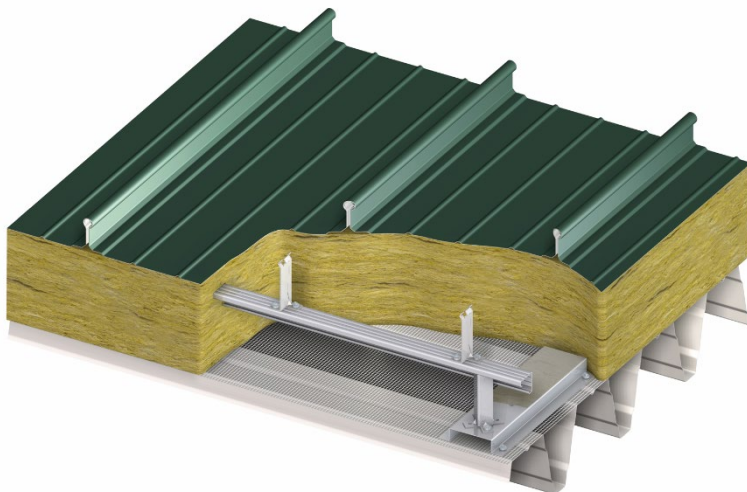
Figure 2 System 4A2 — over purlins — Acoustic Absorption System



- EQC Seam interlocking profiled sheet (see section 1.3 and Figure 7)
- SS110 halter (see section 1.4 and Figure 8)
- Insulation (see section 1.6)
- Quattro bar and bracket (see section 1.5 and Figure 9)
- Vapour control layer (see section 1.8)
- Pre-cut acoustic slab insulation shaped to fit into the liner (see section 1.7)
- Perforated liner sheet (outside the scope of this Certificate)

System reference (Quattro bracket height)
4.15A2 (260 mm), 4.16A2 (240 mm)
4.18A2 (220 mm), 4.24A2 (150 mm).

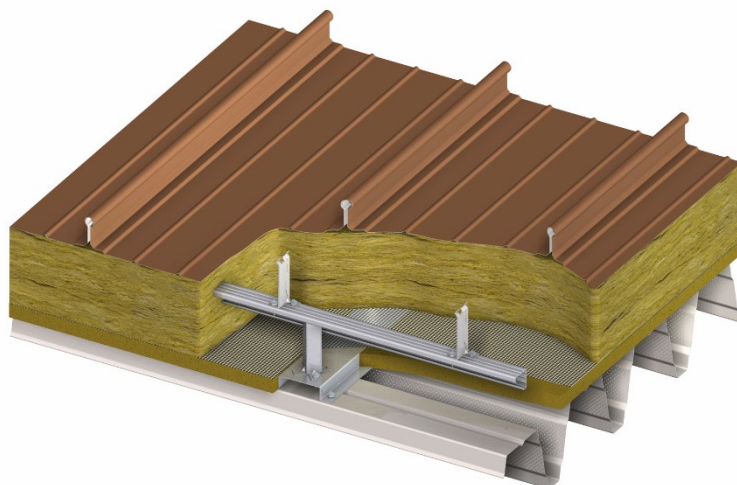
Figure 3 System 5 — on structural decking



- EQC Seam interlocking profiled sheet (see section 1.3 and Figure 7)
- SS110 halter (see section 1.4 and Figure 8)
- Insulation (see section 1.6)
- Quattro bar and bracket (see section 1.5 and Figure 9)
- Top hat section (see section 1.11)
- Vapour control layer (see section 1.8)
- Structural deck (outside the scope of this Certificate)

System reference (Quattro bracket height)
5.15 (220 mm), 5.16 (200 mm)
5.17 (180 mm), 5.24 (100 mm).

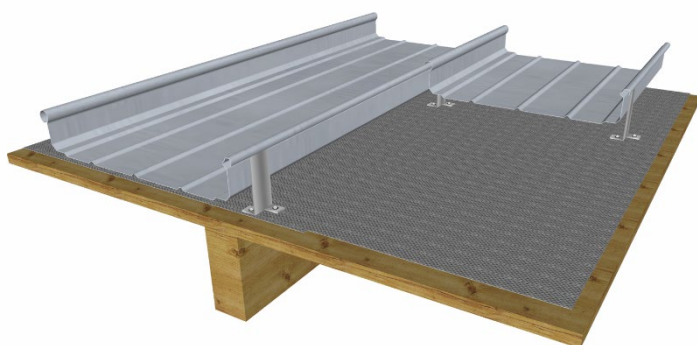
Figure 4 System 5A1 — on structural decking — Acoustic Absorption System



- EQC Seam interlocking profiled sheet (see section 1.3 and Figure 7)
- SS110 halter (see section 1.4 and Figure 8)
- Insulation (see section 1.6)
- Quattro bar and bracket (see section 1.5 and Figure 9)
- Top hat section (see section 1.11)
- Vapour control layer (see section 1.8)
- 30 mm acoustic insulation (see section 1.7)
- Perforated structural deck (outside the scope of this Certificate)

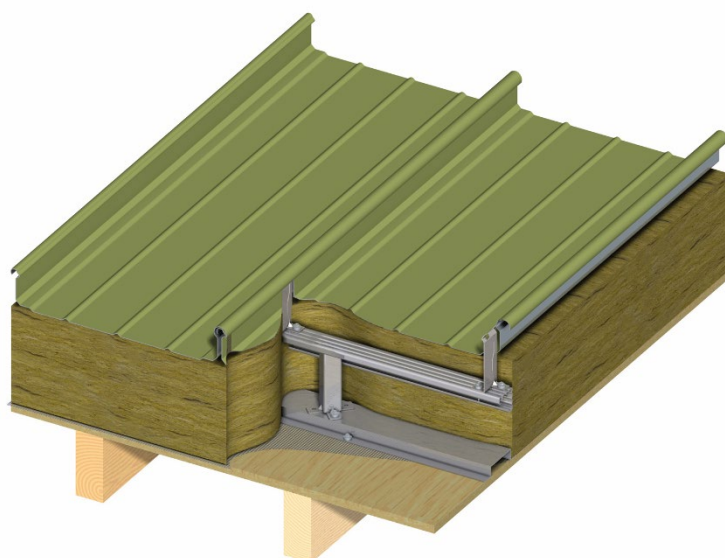
System reference (Quattro bracket height)
5.15A1 (220 mm), 5.16A1 (200 mm),
5.17A1 (180 mm), 5.24A1 (100 mm)

Figure 5 System 8 — on timber decking



- EQC Seam interlocking profiled sheet (see section 1.3 and Figure 7)
- SS110 halter (see section 1.4 and Figure 8)
- Breather membrane (see section 1.9)
- Timber deck (outside the scope of this Certificate).

Figure 6 System 9 — on timber decking



- EQC Seam interlocking profiled sheet (see section 1.3 and Figure 7)
- SS110 halter (see section 1.4 and Figure 8)
- Insulation (see section 1.6)
- Quattro bar and bracket (see section 1.5 and Figure 9)
- Top hat section (see section 1.11)
- Vapour control layer (see section 1.8)
- Timber deck (outside the scope of this Certificate)

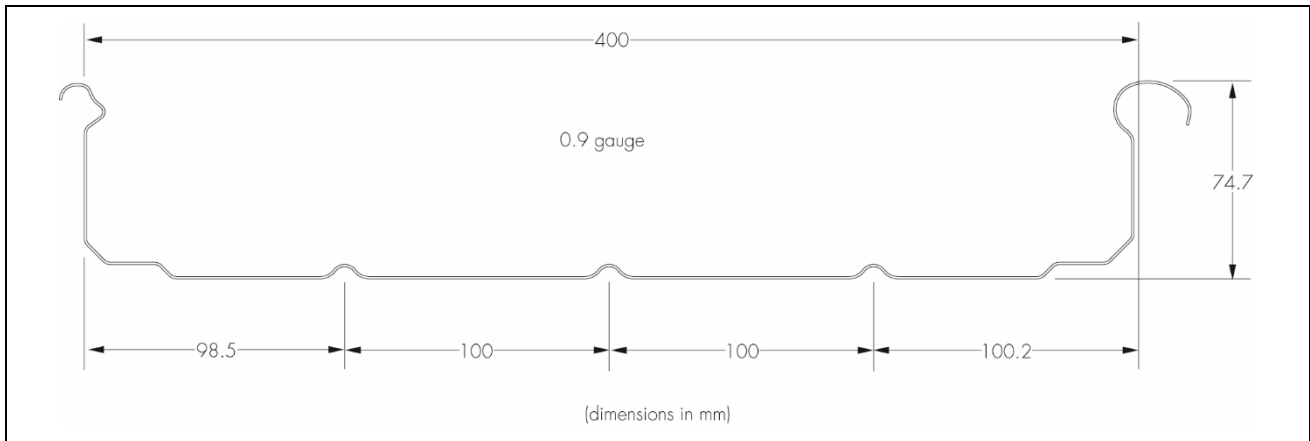
System reference (Quattro bracket height)
9.15 (220 mm), 9.16 (200 mm)
9.17 (180 mm), 9.24 (100 mm).

Component information

1.3 EQC Seam interlocking profiled roofing sheets (see Figure 7) are roll-formed to the full length of the roof, eliminating the need for end laps. Sheet lengths greater than 14 metres are generally rolled on site. Sheets are formed from 0.9 mm thick aluminium alloy 3105 to BS EN 485-2 : 2016 and BS EN 1396 : 2015 and are available in stucco-embossed mill finish, or with the following coatings (other gauges and materials are available but are outside the scope of this Certificate):

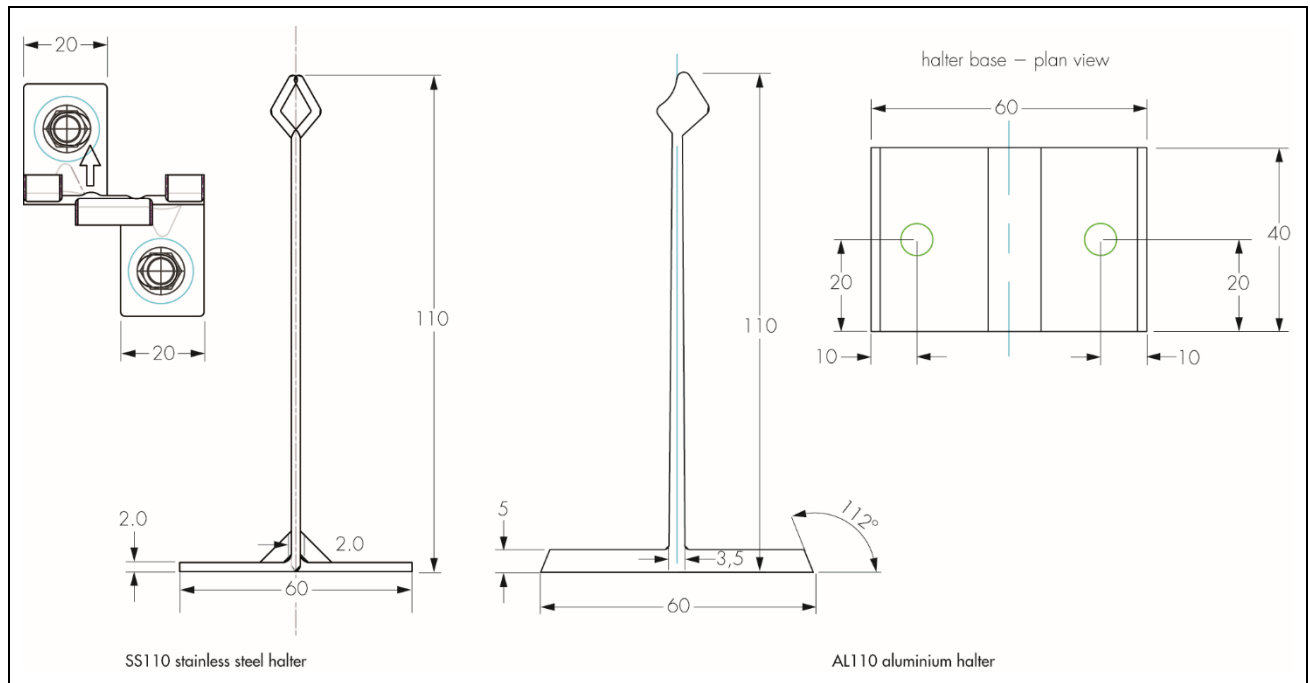
- Euramax ARS (ARS-Coated Aluminium Alloy Coil and Sheet is coated on the face side with a primer and a polyamide modified polyurethane paint, to a total coating thickness of 28 μm)
- Euramax PVF₂ (PVF₂-Coated Aluminium Alloy Coil and Steel is coated on the face side with a primer and a class 1 polyvinylidene fluoride/acrylic paint, to a total coating thickness of 25 μm)
- Hydrocoat PVF₂ (Coated Aluminium Alloy Coil and Sheet is coated on the face side with a primer and a class 1 polyvinylidene fluoride/acrylic paint to a total coating thickness of 25 μm)
- Reynolux PVF₂ (PVDF-Coated Aluminium Sheet and Coil is coated on the face side with primer and PVDF paint to a total nominal coating thickness of 28 μm)
- Reynolux Duragloss 5000 (Duragloss 5000-Coated Aluminium Sheet and Coil is coated on the face side with primer and Duragloss 5000 paint to a total nominal coating thickness of 35 μm)
- Reynolux polyamide (Polyamide-Coated Aluminium Sheet and Coil is coated on the face side with primer and polyamide paint to a total nominal coating thickness of 28 μm) or
- Reynolux polyester (Polyester-Coated Aluminium Sheet and Coil is coated on the face side with primer and polyester paint to a total nominal coating thickness of 26 μm)

Figure 7 EQC Seam sheet profile



1.4 SS110 stainless steel halters and A110 aluminium halters, with pre-fitted WT75 barrier tape to feet, are used to create fixed points and verge detailing. Both halters are 110 mm high (see Figure 8).

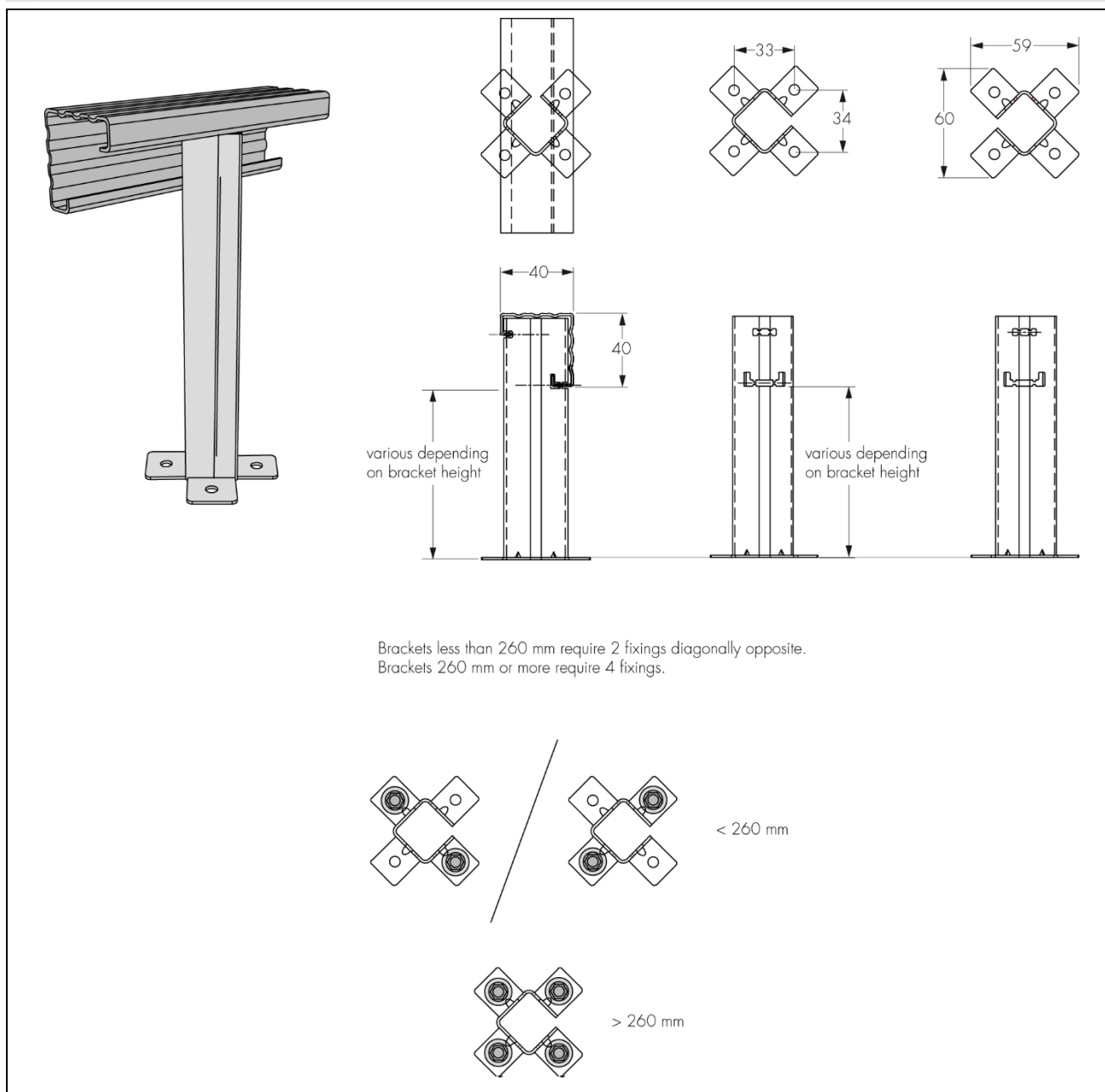
Figure 8 EQC halters (dimensions in mm)



1.5 Quattro bar and bracket (see Figure 9) comprise:

- Quattro bar — formed from 1.2 mm thick, galvanized steel S390 GD Z275 to BS EN 10346 : 2015, supplied in 3.6 m lengths
- Quattro bracket — formed from 1.5 mm thick galvanized steel DX51D + Z275-N-A-C to BS EN 10346 : 2015.

Figure 9 Quattro bar and brackets (dimensions in mm)



1.6 Insulation — blanket thermal insulation material, comprising:

- quilt blanket insulation, mineral wool to BS EN 13162 : 2012 with a thermal conductivity (λ value) of 0.040, 0.037, 0.035 or 0.032 $\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$.

1.7 Acoustic insulation – two types are used depending on the construction:

- EQC Elect Acoustic Slab 30 mm thick, tissue faced and to BS EN 13162 : 2012, with a thermal conductivity (λ value) of 0.034 $\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$
- EQC Elect Pre-cut Acoustic Slab 32 mm thick, tissue faced, pre-cut to fit into the liner trough, and to BS EN 13162 : 2012, with a thermal conductivity (λ value) of 0.034 $\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$.

1.8 Vapour control layer (VCL) (where required):

- EQC Elect VCL — reinforced polyethylene with 500 $\text{MN}\cdot\text{s}\cdot\text{g}^{-1}$ vapour resistance (minimum)
- EQC Elect VCL sealing tape — minimum 12 x 1.5 mm, suitable for the VCL
- EQC HH VCL⁽¹⁾ — foil-faced reinforced polyethylene with 30 000 $\text{MN}\cdot\text{s}\cdot\text{g}^{-1}$ vapour resistance (minimum)

- EQC HH VCL⁽¹⁾ sealing tape — minimum 12 x 1.5 mm (2 rows).

(1) For use in Class 5 humidity environments.

1.9 Breather membrane — EQC Elect Roof Breather Membrane, or other breather membranes, BBA-approved for roofing applications.

1.10 Fixings⁽¹⁾ — supplied by the Certificate holder, or to the Certificate holder's specification, and incorporating:

- carbon or stainless steel self-tapping screws for halter fixing
- carbon or stainless steel screws for Quattro bracket fixing
- carbon or stainless steel self-tapping screws for liner fixing
- aluminium closed-end rivets with stainless steel mandrel, for use on sheet drip angles, verge channels, ridge zeds, ridge closures, flashings and fixed points
- carbon or stainless steel screws for fixing halter, top hat or spacers to timber purlins, rafters or suitable structural plywood, timber or OSB decking⁽²⁾.

(1) Further details of fixings and their use are given in section 17, Table 8.

(2) The designer should confirm the number and length of fasteners necessary to give sufficient pull-out resistance for the grade and size of material used. Guidance is available from the Certificate holder.

1.11 Other accessories covered by this Certificate (unless otherwise stated) and used with the systems, include:

- Verge and ridge components fabricated from aluminium 6005 alloy and comprising:
 - ECZIP-VCP verge clips — ECZIP-VCN5 verge channels — ECZIP-VCLS5 verge closures — ECZIP-VH verge halters
 - ECZIP-RC ridge closures — ECZIP-RZ5 ridge support zeds — ECZIP-SSC sliding ridge clip, used where required
 - ECZIP-DA3 drip angles.
- eaves and ridge foam filler pieces, closed-cell EPDM or MP, with gaps to provide adequate ventilation
- top hat sections consisting of:
 - galvanized steel (minimum grade S220GD + Z225 to BS EN 10346 : 2015) with a minimum thickness of 1.6 mm and
 - aluminium alloy (minimum 0.2% proof stress of 180 N·mm⁻²) with a minimum thickness of 2 mm (for use in association with aluminium decking).
- sealant, type A butyl rubber strip, 4 mm wide or 1 mm by 50 mm side lap tape
- mechanical seaming tool (MST) for securing sheet laps (supplied by the Certificate holder).

1.12 Accessories which can be incorporated into the roof, but which are outside the scope of this Certificate, include:

- liner sheets
- flashings
- eaves, bullnoses and soffits
- walkways, guardrails, fall protection systems and PV arrays (all attached via specialised non-penetrative clamps supplied by EQC)
- GRP or polycarbonate rooflights
- welded details such as hips, valleys and soakers
- openings to details, such as vents.

2 Manufacture

2.1 The seam and liner sheets are manufactured from aluminium or steel coils on roll formers.

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

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

2.3 The management system of Euro Quality Cladding Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by NQA (Certificate 69247) and the Environmental Management System approved to BS EN ISO 14001 : 2015 by NQA (Certificate 63262).

2.4 The Quattro spacer system and halters are manufactured in the UK and are marketed/distributed in the UK and Ireland by the Certificate holder.

3 Delivery and site handling

3.1 EQC Seam Sheets are packed in bundles weighing a maximum of one tonne and carrying a label bearing the BBA logo incorporating the number of this Certificate, the quantity and lengths of the panels and site location. A lifting beam must be used to unload lengths exceeding 8 m.

3.2 Where sheets are to be temporarily stored on the roof, the loadbearing capacity of the structure on which they are being stored must be considered, and they must be restrained from movement caused by either gravity or wind action.

3.3 Where sheets are to be stored on the ground, the base must be dry, firm and gently sloped to allow drainage, and the sheets should be protected from the risk of damage.

3.4 Any damage to components before or during installation will affect the durability of the roof systems. Items should therefore be handled and stored in accordance with the following guidelines:

- liner and decking sheets should be handled in the same manner as the profiled sheets
- rolls of VCL must be handled carefully to avoid puncturing and to prevent damage, and must not be stored on end. For long-term storage, the rolls should be protected from ultraviolet light and stored indoors or under non-translucent covers. The VCL should be dry during installation
- quilt blanket insulation is delivered to site in polyethylene-wrapped rolls. For long-term protection, these must be stored indoors or under a waterproof covering.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on EQC Seam Aluminium Standing Seam Roof Systems.

Design Considerations

4 General

4.1 EQC Seam Aluminium Standing Seam Roof Systems are satisfactory for use as structural roofing in installations with a finished fall of between 1 and 70° and curved installations with a minimum self-curve radius of 45 metres convex, 50 metres concave, where access is available for maintenance and repair only. The systems are intended to be fixed to steel or timber purlins and structural decking of buildings used for industrial, commercial, retail and leisure purposes as well as residential and non-residential buildings such as schools and hospitals.

4.2 If architectural features, through-fittings or rooflights are required on the roof, special care and attention is necessary to ensure that, in common with all metal roofs, these features have been correctly detailed and fitted.

5 Practicability of installation

EQC Seam Aluminium Standing Seam Roof Systems are designed to be installed by a roofing contractor experienced with these types of systems or by a competent general builder. The Certificate holder can provide guidance to contractors and assistance with detailing.

6 Structural performance



6.1 The systems have adequate strength and stiffness to sustain the anticipated loads. Load/span values are given in Table 1 and should be used as follows:

- based on span, it must be confirmed that the proposed specification is adequate to resist the design loads (see section 6.2 of this Certificate)
- the spacing between Quattro brackets must be checked to ensure that it is adequate. Values given in Table 1 are based on 1.2 m bracket spacings.

Table 1 Maximum characteristic resistance to snow and wind actions for EQC Seam

Span (m)	Maximum positive uniformly distributed loading ($\text{kN}\cdot\text{m}^{-2}$)	Snow drift	Maximum negative wind loading ($\text{kN}\cdot\text{m}^{-2}$)
1.0	3.00 ⁽¹⁾	6.87	2.80 ⁽²⁾
1.5	2.92	2.92	1.82
2.0	1.69	2.69	1.61

(1) Value limited by deflection $L/200$.

(2) Value limited by deflection $L/90$.

Notes:

- the resistance values given in the Table should be compared to the characteristic (unfactored) snow and wind loads
- the values given are for uniformly distributed loads on multiple spans. All spans are assumed to be equal to, or within 15% of, the largest span
- the values are based on full scale tests and incorporate an overall safety factor of 2.0 for negative loading (attachment resisting wind uplift) and 1.5 for positive loading
- the deflection of the seam at the unfactored loads is limited to $\text{span}/200$ for snow and $\text{span}/90$ for wind uplift
- the values for the spans between 1 and 1.5 m, and 1.5 and 2 m can be interpolated
- the span is the distance between the centreline of the purlins, or Quattro bars if fitted to a structural deck.
- the data has been prepared in accordance with BS EN 1990 : 2002 and BS EN 1993-1-3 : 2006 and their respective National Annexes
- the self-weight of the EQC Seam sheeting has been taken into account in preparing the data
- for single spans, excessive loads or spans, different deflection criteria and different factors of safety, advice should be sought from the Certificate holder.

6.2 When evaluating the design loads, the wind loads must be calculated in accordance with the recommendations of BS EN 1991-1-4 : 2005 and its National Annex, and the imposed and snow loads must be checked in accordance with the recommendations of BS EN 1991-1-1 : 2002 and BS EN 1991-1-3 : 2003 respectively and their National Annexes.

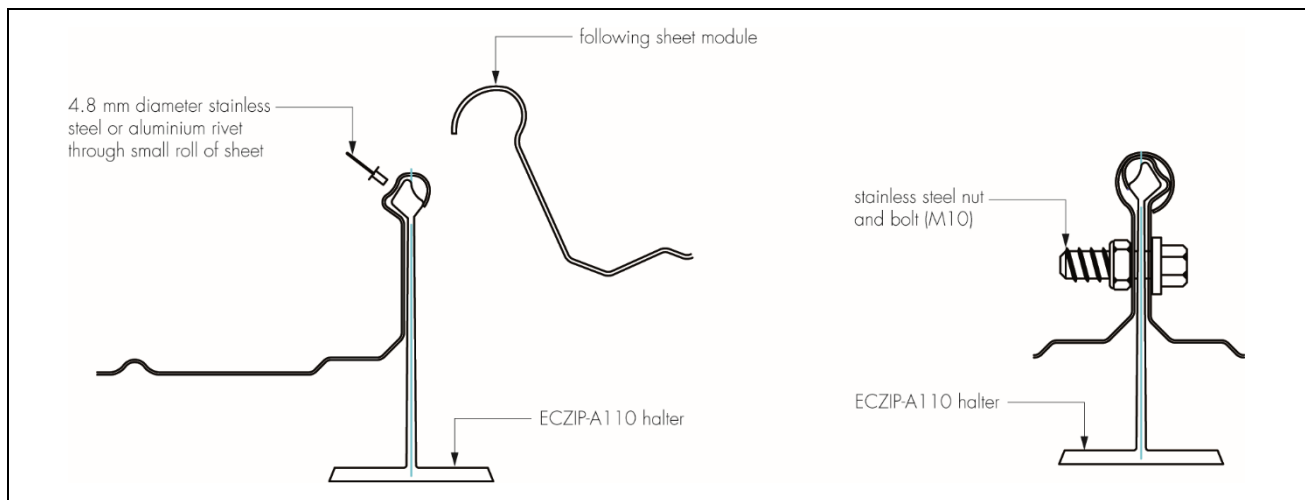
6.3 Where lateral restraint of the liner or deck is part of the structural steel design, the detail of the fixing between the purlin and liner must be determined by the structural engineer responsible for the overall roof design.

6.4 The profiled sheets are capable of withstanding the impacts associated with normal handling, foot traffic, installation and service.

6.5 The roof systems are capable of accommodating thermal movement of the outer sheets provided they are installed in accordance with this Certificate and the Certificate holder's instructions.

6.6 A fixed point should be designed into the roof, generally at the ridge (though it may be at the eaves or a midpoint). The loading on this fixed point must be verified by the Certificate holder or confirmed by a structural engineer and the appropriate fixing detail used (see Figure 10). For loads up to 0.524 kN, one aluminium rivet (ASC-D-48110) may be fixed through the sheet underlap into the halter head. For loads between 0.525 and 1.04 kN, two aluminium rivets may be fixed through the sheet underlay into the halter head. For loads between 1.05 and 3.14 kN, one 10 mm diameter bolt should be fixed through the halter stem and the upstands of the two sheets adjacent to the halter. For loads higher than 3.14 kN, the advice of the Certificate holder should be sought.

Figure 10 Typical fixed point details



7 Weathertightness



7.1 When installed in accordance with the Certificate holder's instructions, the systems are weathertight when used in installations with finished falls of 1 to 70° or curved roofs with a minimum self-curve radius of 45 metres convex, 50 metres concave, and within the recommended maximum design wind pressures and exposure conditions.

7.2 The weathertightness of the systems will not be adversely affected by normal service deflections.

8 Thermal performance



8.1 The thermal performance of each building incorporating the roof systems must be evaluated in accordance with the relevant national Building Regulations, and is the responsibility of the overall designer of the building.

8.2 Thermal transmittance values (U values) for example roof constructions are given in Table 3 and descriptions of these roof constructions can be found in Table 2. These have been calculated with Quattro brackets at 1.2 m centres using a thermal conductivity (λ value) of $0.040 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ for the mineral wool quilt.

8.3 Ridge junctions with continuous insulation can adequately limit heat loss.

Table 2 Description of EQC Seam Roof Systems

System	Outer sheet	Insulation	Spacer	Liner sheet
4	EQC Seam	Various depths of quilt various conductivities	SS110 halters on Quattro bar and bracket various heights ⁽¹⁾	Non-structural liner sheet ⁽²⁾
4A2	EQC Seam	Various depths of quilt various conductivities	SS110 halters on Quattro bar and bracket various heights ⁽¹⁾	Non-structural liner sheet ⁽²⁾
5	EQC Seam	Various depths of quilt various conductivities	SS110 halters on Quattro bar and bracket various heights ⁽¹⁾ on 30 mm deep top hat section	Structural deck in steel or aluminium in various profiles and thicknesses
5A1	EQC Seam	Various depths of quilt various conductivities	SS110 halters on Quattro bar and bracket various heights ⁽¹⁾ on 30 mm deep top hat section	Structural deck with perforation in steel or aluminium in various profiles and thicknesses
8	EQC Seam	None – cold roof	SS110 halters	Ply, timber or OSB deck ⁽²⁾
9	EQC Seam	Various depths of quilt various conductivities	SS110 halters on Quattro bar and bracket various heights ⁽¹⁾ on 30 mm deep top hat section	Ply, timber or OSB deck ⁽²⁾

Note: For internal sheet, 0.9 mm perforated aluminium liner can be used for acoustic constructions in buildings with aggressive internal environments.

(1) From 80 to 320 mm, inside the scope of this Certificate.

(2) Non-structural steel liner, structural deck, plywood, timber or OSB deck – outside scope of this Certificate.

Table 3 U values ($W \cdot m^{-2} \cdot K^{-1}$) for example constructions

System 4 ⁽¹⁾	Quattro bracket height (mm)	Span (m) ⁽²⁾	U values ($W \cdot m^{-2} \cdot K^{-1}$)
4 (and A2 variant)	260	1.5	0.15
4 (and A2 variant)	240	1.5	0.16
4 (and A2 variant)	220	1.5	0.18
4 (and A2 variant)	150	1.5	0.24
System 5 ⁽¹⁾	Quattro bracket height (mm)	Span (m) ⁽³⁾	U values ($W \cdot m^{-2} \cdot K^{-1}$)
5 (and A1 variant)	220	1.5	0.15
5 (and A1 variant)	200	1.5	0.16
5 (and A1 variant)	180	1.5	0.17
5 (and A1 variant)	100	1.5	0.25

(1) See section 1.2 for system descriptions.

(2) The span is the distance between purlins and Quattro bars.

(3) The span is the rail spacing of the Quattro system.

Notes:

- General spacing of 1.5 m is applicable for the most commonly specified deck profiles. The spacing is larger for some deck profiles. Contact the Certificate holder for more information.
- Other combinations of bracket height and insulation are available. For U value calculations in accordance with the requirements of the national Building Regulations for individual projects, consult the Certificate holder.
- Quilt insulation installed is larger than the void it fills and will be lightly compressed within the systems. Contact the Certificate holder for further information.
- Standard Quattro bracket set out along the rails at 1.2 m.

8.4 Care must be taken in the design and installation to maintain continuity of thermal insulation and air barriers, particularly at junctions, openings and services penetrations. Detailed guidance on calculating junction psi values, or acceptable defaults, can be found in the relevant documents supporting the national Building Regulations.

9 Condensation



9.1 In common with all metal roof constructions, there is a risk of condensation which can arise as either interstitial condensation within the roof construction or surface condensation at thermal bridges.

Surface condensation



9.2 The temperature at which surface condensation will occur on the internal surfaces of the roof is dependent on the internal relative humidity and the internal and external temperatures.

9.3 When assessed by computer modelling, insulated roof systems with Quattro brackets deeper than 100 mm (the smallest Quattro bracket suitable for the liner profile depth) can achieve a negligible risk of condensation occurring on the internal surfaces. This is not verified by the BBA, but further information and *F* factor calculations can be provided by the Certificate holder.



9.4 The risk of surface condensation and mould growth for other constructions, junctions with walls, roof openings, service penetrations and any area where insulation thickness is significantly reduced and/or metal bridging is increased, should be assessed in accordance with BS EN ISO 13788 : 2012. Additional guidance in connection with this can be found in BS 5250 : 2021.

Interstitial condensation



9.5 Calculations to BS EN 13788: 2012 under the normal climatic conditions experienced in the UK (humidity classes 1-4 as per Table 4 below), indicate that interstitial condensation is unlikely to be a significant problem and the risk of reducing the thermal and structural performance of the roof systems will be limited. This assessment is only valid if the following conditions are fulfilled in accordance with the Certificate holder's instructions and this Certificate:

- the VCL remains undamaged, is continuous over ridges and hips, and is sealed at penetrations/abutments
- VCL laps are adequately sealed
- for installations without the separate VCL, the liner panel laps are adequately sealed (in accordance with the Certificate holder's specifications)
- the ribs of the EQC Seam profile are ventilated by air passing along them from, and to, open areas at the eaves and the ridge.

Table 4 Building internal humidity classes

Humidity class ⁽¹⁾	Building type
1	Storage areas
2	Offices, shops and dwellings with low occupancy
3	Dwellings with high occupancy and other buildings with unknown occupancy
4	Sports halls, kitchens, canteens, school classrooms, hospitals and buildings heated with unflued gas heaters
5	Special buildings (eg laundry, brewery, swimming pool)

(1) As referenced in BS 5250 : 2021.

9.6 For buildings in internal humidity class 5 and in buildings or areas of a building with special internal design conditions, a hygrothermal assessment of the proposed roof systems should be undertaken using the guidance given in BS 5250 : 2021, BS 5925 : 1991 and BS 6229 : 2018, to establish whether special provisions are required.

9.7 Where a breather membrane is required, such as for System 8, an appropriate membrane with relevant third party accreditation must be used.

9.8 A separate VCL may be required if the roof systems are used in buildings categorised as Class 3 or higher. A VLC is required for roof Systems 5 and 9 and for acoustic systems with a perforated liner or deck, in all applications.

10 Air permeability



10.1 The airtightness of the systems is reliant on the careful sealing of the VCL and other internal details. In addition to sealing at all joints, the VCL must be suitably sealed at the perimeter and all penetrations. Details of sealing at all laps, eaves, ridges, hips, valleys and penetrations must be in accordance with the Certificate holder's instructions.

10.2 The airtightness of the building will also be dependent on the performance of the other building elements. Provided these also incorporate appropriate design details and building techniques, air infiltration through the building fabric should be minimal and the building reasonably airtight.

10.3 A proportion of completed buildings are subject to pre-completion testing for airtightness in accordance with the requirements of documents supporting the relevant national Building Regulations.

11 Performance in relation to fire



11.1 The Certificate holder has not declared a resistance to external fire exposure to BS EN 13501-5 : 2016 or BS 476-3 : 2004, for the systems.



11.2 In Wales and Northern Ireland, designers may refer to the relevant documents supporting the national Building Regulations for certain roof specifications that can achieve a notional $B_{ROOF}(t_4)$ designation without testing and are consequently unrestricted.



11.3 The designation of a roof system can be affected by components other than the roof covering, eg insulation materials, substrates/decking and membranes. These constructions should therefore be evaluated by reference to the requirements of the documents supporting the relevant national Building Regulations and any consequent restrictions imposed by those documents, on a case-by-case basis. In the absence of a designation, the system should not be used within 20 metres of a boundary (24 metres in Scotland).

Ceilings

11.4 The reaction to fire classification of the roof system incorporating the liners, or other ceilings, should be evaluated by reference to the requirements of the documents supporting the relevant national Building Regulations.

Cavities



11.5 The Certificate holder has not declared a reaction to fire classification for the reverse side of the coated sheets or liners (facing into a cavity). Cavity barriers should be provided in accordance with the requirements of the documents supporting the national Building Regulations taking this into account.

Junctions with compartment walls



11.6 Where the system is to form a junction with a compartment wall, designers must ensure that there is adequate resistance to fire spread from one compartment to another, either over the roof or from within one of the compartments.

12 Acoustic performance

12.1 The systems covered by this Certificate are described in Tables 5 to 7. Other constructions are available covering a wider range of acoustic performances and U values but these are outside the scope of this Certificate (details are available from the Certificate holder).

12.2 The sound reduction indices given in Table 5 are indicated from test data in accordance with BS EN ISO 10140-2 : 2021 and BS EN ISO 717-1 : 2020.

Table 5⁽¹⁾ Sound-reduction indices

System	Quilt insulation	Depth of Quattro bracket (mm)	U value	Sound-reduction index (dB)
4.18 ⁽¹⁾	Knauf 0.040	220	0.18	42 (–2 –8)
4.15 ⁽¹⁾	Knauf 0.040	260	0.15	43 (–2 –7)
4.25A2 ⁽¹⁾	Knauf 0.040	150	0.25	37 (–1 –6)

(1) Data from report C/22349/T01, *The Laboratory Determination of The Airborne Sound Transmission of Various Roof Systems*.

Note: For System 5 applications, consult the Certificate holder for advice.

12.3 Test data to BS EN ISO 354 : 2003 indicate the absorption coefficients given in Table 6.

Table 6 Sound absorption coefficients

System ⁽¹⁾	Octave frequency bands (Hz)	Sound absorption coefficient (a)	Practical sound absorption coefficient ⁽²⁾ (ap)
4A2 with 150 mm Quattro brackets and Knauf 0.040 insulation ⁽³⁾⁽⁴⁾	125	1.20	1.00
	250	1.15	1.00
	500	1.05	1.00
	1000	0.99	1.00
	2000	0.98	0.95
	4000	0.96	0.95
5A1 with 150 mm Quattro brackets and Rockwool 0.040 insulation ⁽⁵⁾⁽⁶⁾	125	1.43	1.00
	250	0.98	0.95
	500	0.85	0.85
	1000	0.42	0.45
	2000	0.27	0.30
	4000	0.26	0.25

(1) See section 1.2 for full system descriptions.

(2) Calculated in accordance with BS EN ISO 11654 : 1997.

(3) Knauf factory-clad 40 quilt.

(4) The weighted sound absorption coefficient (aw) was calculated as 1.00 in accordance with BS EN ISO 11654 : 1997, giving a class A rating. The noise reduction coefficient (NRC) was calculated as 1.05 in accordance with ASTM C 423-01 :2017.

(5) Rockwool Cladding Roll quilt.

(6) The weighted sound absorption coefficient (aw) was calculated as 0.35 in accordance with BS EN ISO 11654 : 1997, giving a class D rating. The noise reduction coefficient (NRC) was calculated as 0.65 in accordance with ASTM C 423-01 : 2017.

13 Maintenance



13.1 The systems should be inspected regularly for accidental damage to the roof sheets and their coatings, and also for any build-up of dirt and debris. Damage must be repaired, and accumulated dirt and debris removed. The frequency of inspections will depend on the environment and use of the building.

13.2 In industrial and coastal areas, it may be necessary to clean the installation periodically by hosing with water and a neutral detergent to restore its appearance and to remove corrosive deposits. It may be necessary to clean soffits in any environment.

13.3 A planned maintenance cycle should be introduced if any extended design life is required.

13.4 Damaged sheets can be removed and replaced. The Certificate holder should be contacted for details.

14 Durability



14.1 The systems are resistant to all normal atmospheric corrosive conditions (including coastal and industrial) and will withstand considerable distortion of the metal without losing adhesion between the coating and the substrate.

14.2 The durability of the roofing sheets will depend upon the coating material, the immediate environment, aspect faced and use.

14.3 The external sheets will continue to function as a roof covering for the periods shown in Table 7.

Table 7 Minimum service life

Sheet material	Minimum service life (years)
Euramax PVF ₂ coated aluminium	40
Euramax ARS coated aluminium	40
Hydrocoat PVF ₂ coated aluminium	40
Reynolux PVF ₂	40
Reynolux Duragloss 5000 coated aluminium	40
Reynolux polyamide	40
Reynolux polyester	40



14.4 When used in the context of this Certificate, roofing constructed with uncoated stucco-finished aluminium sheet will have a minimum service life of 40 years in rural and suburban environments and a minimum of 25 years in more aggressive areas, eg severe industrial or coastal environments.

14.5 Maintenance painting may be necessary to restore the appearance of coated sheets or to extend their design life – see Table 8, below, for minimum overcoating life. The Certificate holder can recommend a suitable system for maintenance painting.

Table 8 Minimum overcoating life

Sheet material	Minimum overcoating life (years) ⁽¹⁾	
	Environment	
	Inland	Coastal
Euramax PVF ₂ coated aluminium	20	15
Euramax ARS coated aluminium	20	15
Hydrocoat PVF ₂ coated aluminium	20	15
Reynolux PVF ₂ coated aluminium	20	15
Reynolux Duragloss 5000 coated aluminium	15	10
Reynolux Polyester coated aluminium	15	10
Reynolux Polyamide coated aluminium	20	15

(1) Minimum overcoating life is the minimum life before the first maintenance painting may be required.



14.6 For coated sheets, if the building has an exposed eaves detail and is in an aggressive environment, or if there are corrosive conditions inside, a more durable specification of the reverse-side coating should be used. Alternatively, eaves edge corrosion of coated steel sheets can be minimised by overpainting. Details can be obtained from the Certificate holder.

14.7 Colour changes will be slight and uniform on any one elevation.

14.8 Stucco-finished uncoated aluminium sheets must not come into contact with the materials listed below:

in any conditions

- ungalvanized mild steel
- copper and its alloys (including the run-off from copper roofs)

- timber treated with fire retardants
- mortar
- alkali-bearing materials.

In damp conditions

- timber preserved with copper compounds
- other metals (ie bimetallic contact).

in coastal environments

- lead
- stainless steel (other than the unexposed supporting halters).

in industrial environments

- lead.

14.9 Where compatibility problems are likely to occur, barriers such as paints, tapes or pads appropriate to the materials and environment should be incorporated.

14.10 Under normal exposure conditions, aluminium sheets do not need painting for corrosion resistance but, if desired, can be painted using conventional techniques for the materials.

15 Reuse and recyclability

The roofing systems can be 100% recycled and/or reused. However, detailed advice should be sought from the Certificate holder when considering reuse.

Installation

16 General

16.1 Installation of EQC Seam Aluminium Standing Seam Roof Systems must be carried out by experienced roofing contractors in accordance with the Certificate holder's instructions. Guidance can be provided by the Certificate holder for contractors who are unfamiliar with the systems.

16.2 Roof surfaces can be slippery when wet, and the designer, contractors and others accessing the roofs should consider this when preparing the Health and Safety plans for projects.

17 Procedure

17.1 The liner or decking sheets are placed in position with all joints lapped, stitched and sealed (where necessary) and fixed to the roof purlins/top hat sub-purlins/rafters/main structural frame. Solid filler blocks are located in the liner or decking profile at details such as eaves, hips and ridges to ensure adequate airtightness at these points.

17.2 Where a sealed liner is used to achieve vapour control in place of a separate VCL, the end laps must be a minimum of 100 mm and sealed with 4 mm type A butyl rubber strip positioned above fixing positions parallel to the edge of the sheet.

17.3 The liner side laps are sealed with 50 x 1 mm type A butyl rubber strip positioned centrally along the side lap joint. Alternatively, 4 mm type A butyl rubber strip can be positioned inside the lap with stitching screws at 500 mm centres.

17.4 All fixings penetrating the liner must have bonded washers to provide an air seal.

17.5 Swarf or debris must be removed from the liner, timber or metal decking, or acoustic insulation before being covered with the VCL, if required. The VCL is laid over the liner or decking sheets and acoustic insulation, if present, and is made continuous by lapping all joints by a minimum of 150 mm and sealing with VCL sealing tape. Sealing tape should

be a minimum of 12 x 1.5 mm. One strip of VCL sealant tape in the lap is used for standard environments; two strips are used for high humidity environments. For A2 systems over perforated liner, the VCL is laid over the acoustic insulation slabs and into liner troughs where Quattro brackets are to be fitted. In these cases it is preferable to roll the VCL out from verge to verge, starting at the bottom of the roof slope and overlapping each subsequent roll. Further guidance can be provided by the Certificate holder. The VCL sheets should be continuous over ridges/hips and sealed to penetrations, abutments and perimeters. Breather membrane, if required, should be rolled out from verge to verge, starting at the bottom of the roof slope and overlapping each subsequent roll. All joints should be lapped by a minimum of 150 mm.

17.6 The Quattro brackets are inserted into the rail at appropriate centres and fixed, using appropriate fasteners, through the VCL and liner sheet directly to the purlins or top hat section, if used. All fixings must have bonded washers to provide an air seal. The appropriate halters are fitted to the rail at appropriate centres using the template and guidance provided by the Certificate holder. Pan support fillers are fitted as required to the rail between halters, typically at ridge and eaves lines. Aluminium A110 halters are used at the verges and fixed points only, while stainless steel SS110 halters are employed at all other locations.

17.7 The first layer of quilt blanket insulation is laid between and underneath the Quattro bar. The second layer is laid over the Quattro bar, taking care to ensure continuity and that the space is fully filled, ie no voids.

17.8 The EQC Seam sheet underlap is offered up to the second row of halters and lowered and engaged over the halter heads. The sheet overlap then locates over the first row of halters and is closed with the seaming tool, prior to fitting the verge components to secure the sheet edge.

17.9 The fixed point detail should be completed prior to laying the next sheet, if fixing a rivet through the sheet underlap. If alternative details are being used, they should be completed at the appropriate stage.

17.10 The next sheet underlap is offered up to and engaged with the next row of halters and the sheet overlap is lowered until it laps over the preceding sheet underlap.

17.11 The sheet lap is secured using the mechanical seaming tool and the fixing of the sheets continues as above.

17.12 On completing the installation of the sheets on the roof, the ending verge components are fitted and the various ridge perimeter and eaves fittings are fixed. Typical details are shown in Figures 11a, 11b, 11c and 11d.

17.13 The barge board flashing is fixed to the verge/perimeter to complete the detail, using the appropriate fasteners at 600 mm centres, or closer if site conditions require.

17.14 The sheet pan must be turned up at the ridge and turned down at the eaves. For pitches greater than 4°, the turn down at eaves may be omitted.

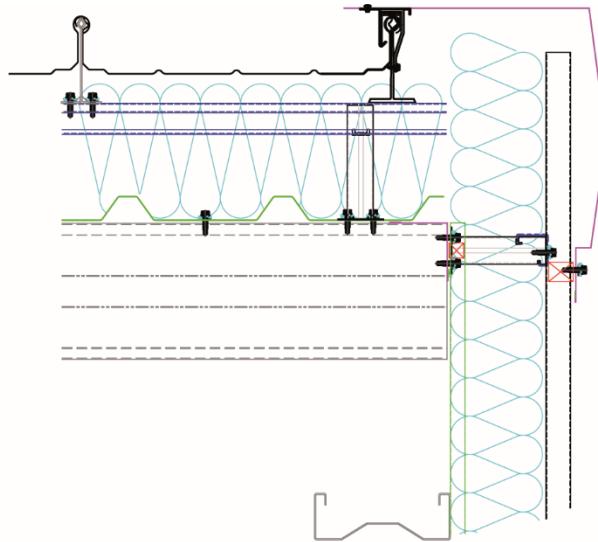
17.15 The turn down detail should be made after the 3 mm drip angle and eaves fillers have been fitted.

17.16 The ridge detail with fixed point (Figure 11b) is constructed by clipping the ridge filler blocks into the ridge closure that is positioned close to the apex at 90° to the profiled sheets. The ridge closure is secured with an appropriate fastener to the ridge zed which is fixed, in turn, through each sheet crown.

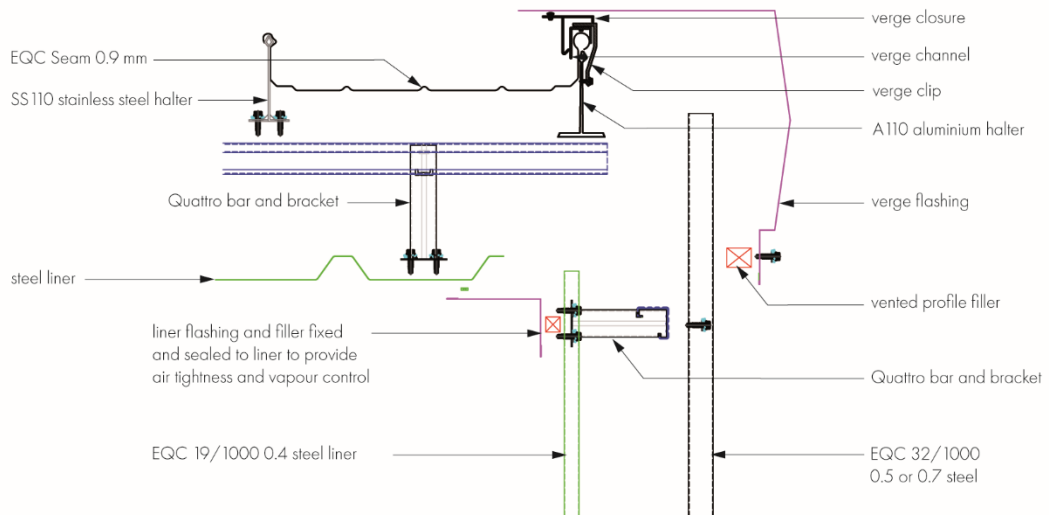
17.17 The ridge flashing is secured to the ridge zed using an appropriate fixing every 400 mm, positioned between the sheet upstands. Care must be taken to avoid damage/penetration of the profiled sheets when fixing the ridge flashing to the ridge zed. If the fixed point is not located at the ridge halter, a sliding ridge detail should be used, as illustrated in Figure 11c.

17.18 Eaves details may vary but a typical construction is shown in Figure 11d.

Figure 11a Typical verge installation details



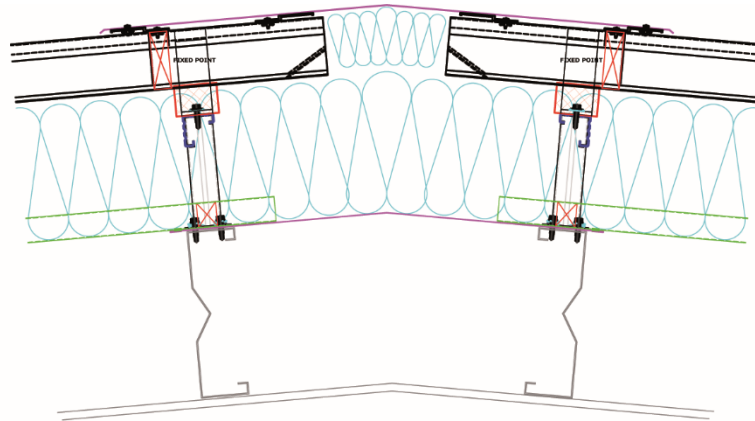
EQC ELECT SYSTEM 4 ROOF CONSTRUCTION



Insulation excluded for clarity.
A range of mineral and glass wool insulations are available for different requirements

Verge

Figure 11b Typical ridge (fixed point) installation detail



EQC ELECT SYSTEM 4 ROOF CONSTRUCTION

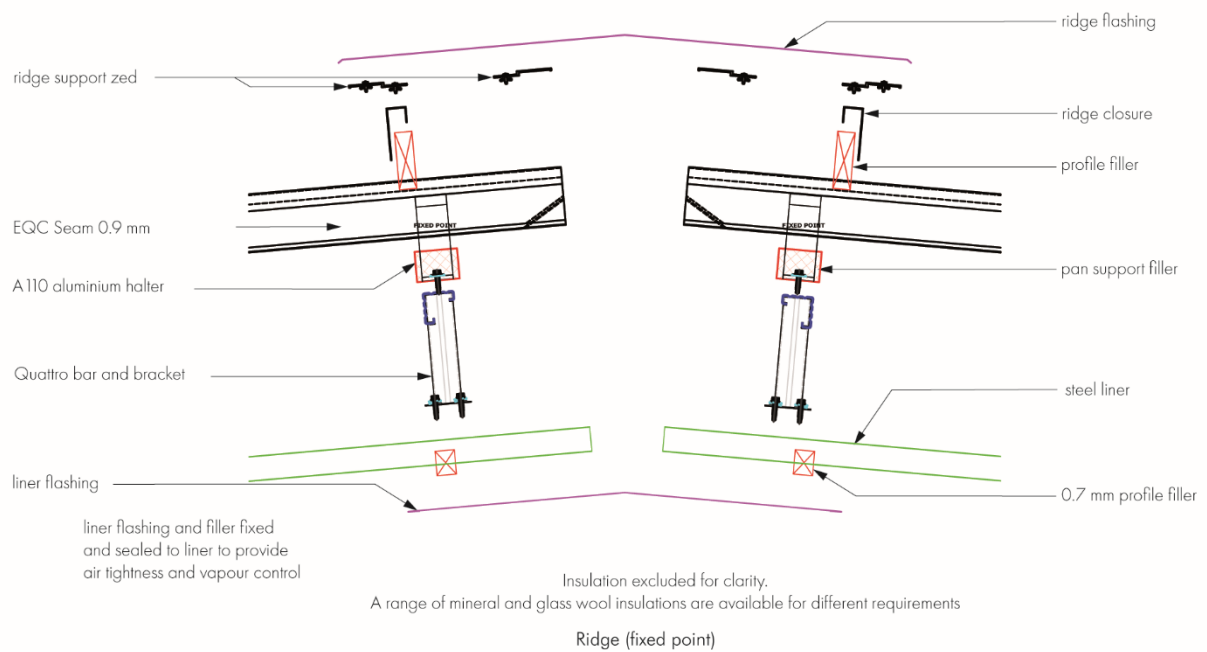


Figure 11c Typical ridge (sliding) installation detail

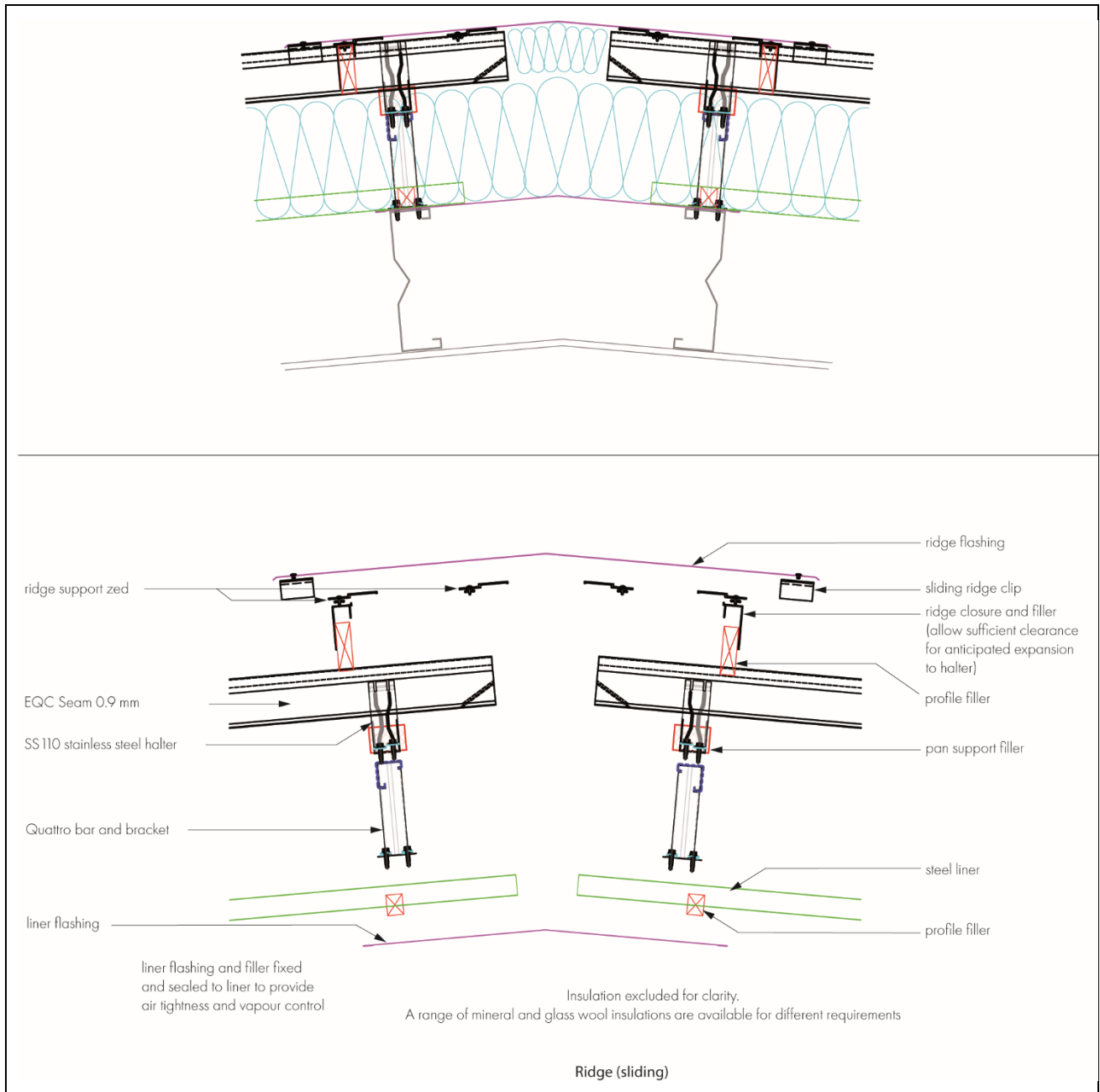
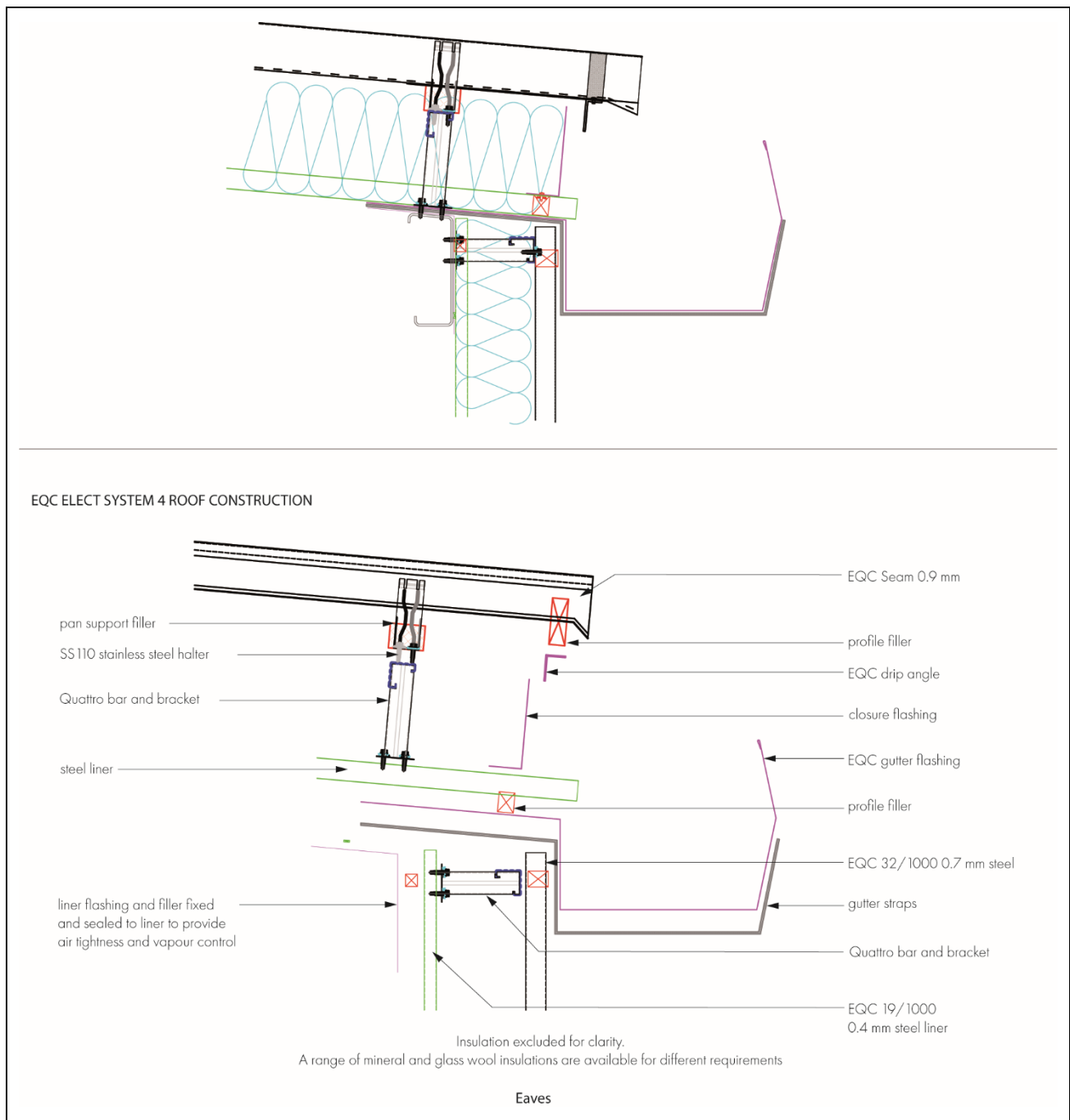


Figure 11d Typical eaves installation details



17.19 Closures and fillers for hip details are cut according to roof pitch and plan angle for each side of the hip, to suit project requirements. They are positioned parallel to the centre line of the hip.

17.20 Details of fixings and their appropriate use are given in Table 8 of this Certificate.

Table 8 Details of fixings

Application	Description	Frequency
SS110 halter and A110 halter to Quattro bar	6 mm minimum diameter self-drill fixing 25 to 29 mm 304 grade stainless steel	2 per halter
Quattro bracket to cold-rolled steel purlins — max 3 mm thick (including liner)	5.5 mm diameter self-drill 25 to 28 mm long with washer (304 grade stainless steel for Elect Plus, carbon steel for Standard and Elect)	2 per bracket. 4 per bracket for brackets 260 mm and over
Quattro bar to bracket fix	5.5 mm diameter self-drill 25 to 28 mm long with washer (304 grade stainless steel for Elect Plus, carbon steel for Standard and Elect)	1 through rail into bracket at beginning and end of each run of rail
Systems 5, 5A and 9 Quattro bracket to 1.6 mm galvanized top hat sections	5.5 mm diameter self-drill 25 to 28 mm long with washer (304 grade stainless steel for Elect Plus, carbon steel for Standard and Elect)	2 per bracket. 4 per bracket for brackets 260 mm and over
0.7 mm steel liner to cold-rolled steel purlins — max 3 mm thick. Standard (and perforated)	5.5 mm diameter self-drill 25 to 28 mm long with washer (304 grade stainless steel for Elect Plus, carbon steel for Standard and Elect)	Sheet ends and end laps: every corrugation (perforated liner: minimum 29 mm washer and 140 mm end laps for non-fragile Class C). Intermediate supports: alternate corrugations
1.6 mm galvanized steel top hat to structure deck	Aluminium rivet 604-6-3W; pre-drill both top hat and deck	2 per crown of deck profile
Anchor fixings at eaves sheet to drip angle to sheet	Aluminium body closed-end rivet with stainless steel mandrel	2 per sheet pan
Verge channel to sheet	Aluminium body closed-end rivet with stainless steel mandrel	At approximately 400 mm centres
Verge flashing to verge closure	Aluminium body closed-end rivet with stainless steel mandrel	At approximately 600 mm centres
Ridge zed to sheet	Aluminium body closed-end rivet with stainless steel mandrel	1 fixing at each sheet upstand
Ridge flashing to ridge zed	Aluminium body closed-end rivet with stainless steel mandrel	At approximately 400 mm centres (over the pan of each sheet). Hips — over the pan of each sheet
Ridge closure to ridge zed	Aluminium body closed-end rivet with stainless steel mandrel	1 per closure

Technical Investigations

18 Tests

Tests were carried out on the systems and the results assessed to determine:

- resistance to dead and imposed (snow) loading
- resistance to wind loading
- behaviour of fixings and profile under static and cyclic loading
- resistance to impact
- behaviour under concentrated loads
- behaviour under thermal movement.

19 Investigations

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

19.2 An assessment was made of:

- fire resistance
- practicability of installation
- condensation risk and thermal transmittance
- weathertightness of fixed cladding and details.

19.3 Existing information, relating to the durability of the systems, performance in fire and compatibility of materials in contact, was assessed.

19.4 A visit was made to a site to assess the practicability of installation.

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BS EN 1991-1-3 : 2003 *Eurocode 1 : Actions on structures — General actions — Snow loads*

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BS EN ISO 717-1 : 2020 *Acoustics — Rating of sound insulation in buildings and of building elements — Airborne sound insulation*

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

BS EN ISO 10140-2 : 2021 *Acoustics — Laboratory measurement of sound insulation of building elements — Measurement of airborne sound insulation*

BS EN ISO 11654 : 1997 *Acoustics—Sound absorbers for use in buildings — Rating of sound absorption*

BS EN ISO 13788 : 2012 *Hygrothermal performance of building components and building elements — Internal surface temperature to avoid critical surface humidity and interstitial condensation — Calculation methods*

BS EN ISO 14001 : 2015 *Environmental management systems — Requirements with guidance for use*

BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around openings*

ETA 13/0698 *Spacer Kits for Built-up Metal Roof and Wall Cladding*

20 Conditions

20.1 This Certificate:

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

20.2 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.

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

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

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

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

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

20.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.