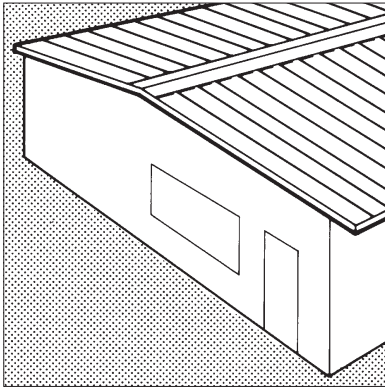


## Product



• THIS DETAIL SHEET RELATES TO THE KEYBEMO 305 AND 400 PROFILED ROOF SYSTEMS, SINGLE-SKIN ROOF SHEETS, COMPRISING PROFILED ALUMINIUM ALLOY-COATED STUCCO-EMBOSSED ALUMINIUM PANELS AND ACCESSORIES.

• The systems are for use as fully-finished structural roof decks with slopes from 1.5° to 60°, where access is available only for maintenance or repair.

• The systems are weathertight and structurally stable within the limits set out in this Certificate.

This Detail Sheet must be read in conjunction with the Front Sheets, which give the product's position regarding the Building Regulations, general information and the Conditions of Certification.

## Technical Specification

### 1 Description

1.1 The KeyBEMO 305 and 400 Profiled Roof Systems are single-skin roof sheets (see Figures 1 and 2) attached to the roof using fixing halters (see section 5 of the Front Sheets). The sheets are secured by folding the sheet profile over the halter.

1.2 The profiles can be manufactured in lengths of up to 1.50 m. The sheets are normally made to measure for each installation and are available in thicknesses (mm) of:

KeyBEMO 305	0.9, 1.0 or 1.2
KeyBEMO 400	0.9 or 1.0.

1.3 The sheets can be manufactured<sup>(1)</sup> from either stucco-embossed aluminium to BS EN 573-3 : 1995, AW3005 H27, or BBA-approved colour-coated aluminium to BS EN 573-3 : 1995, AW3105 H25.

(1) Mechanical properties of aluminium when tested to BS EN 485-2 : 1995 are:

tensile strength	—	average 230 MPa
yield strength	—	average 210 MPa.

Figure 1 KeyBEMO 305 and 400

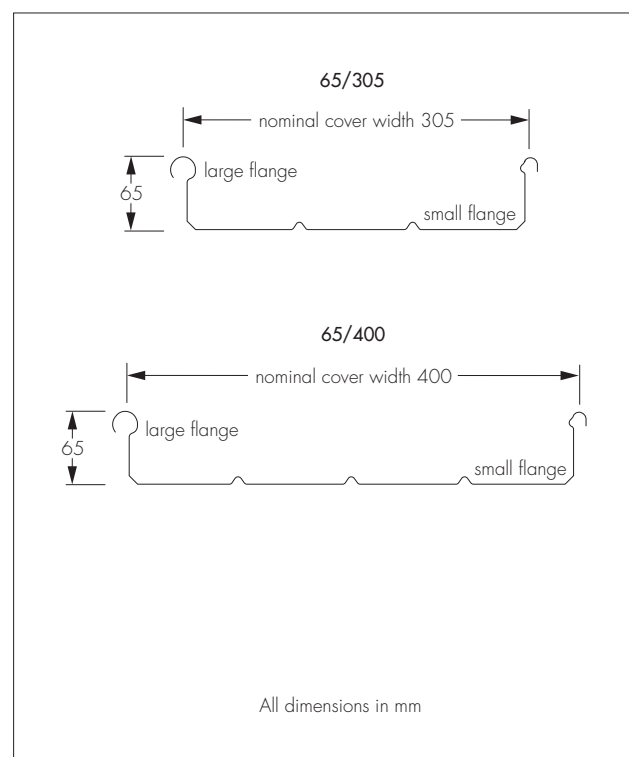
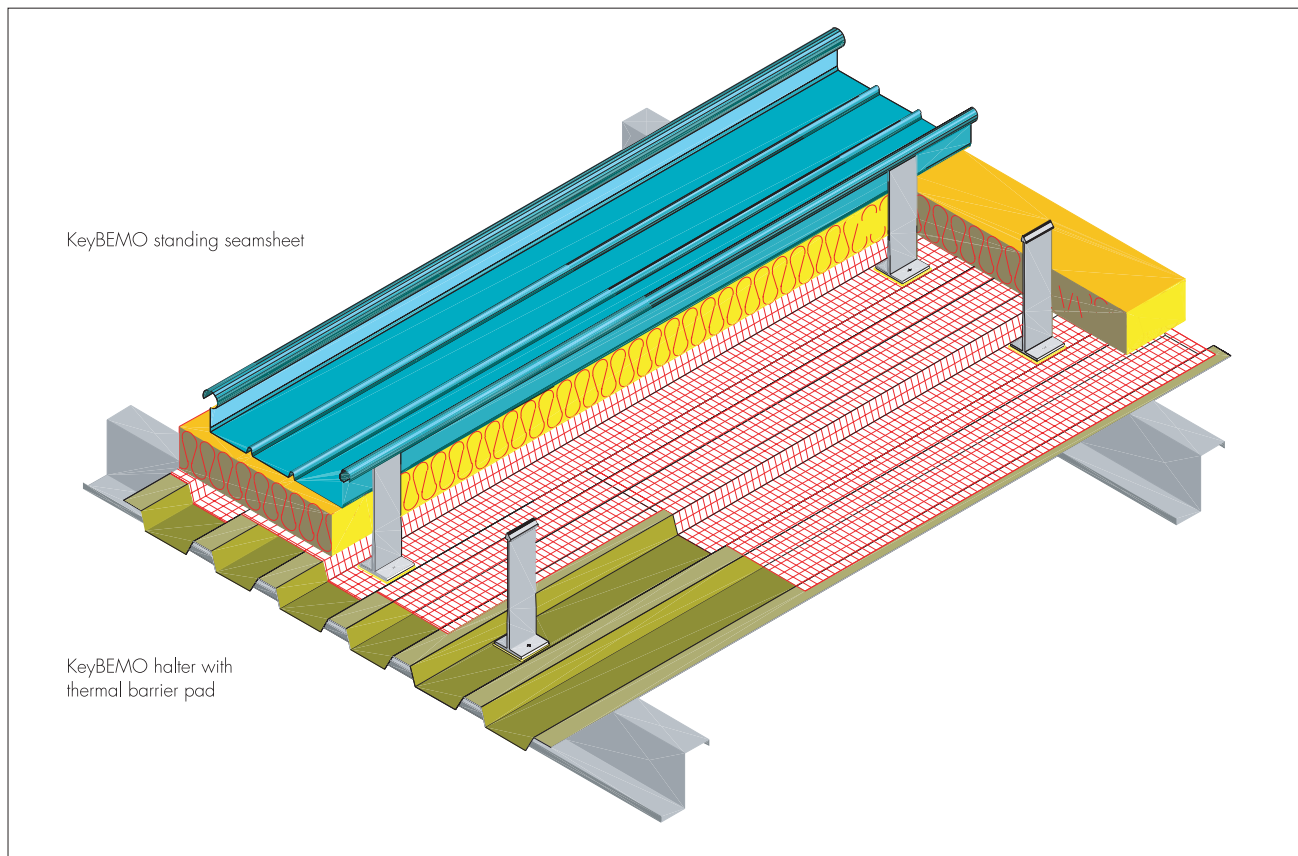


Figure 2 KeyBEMO 305 and 400 construction



## Design Data

### 2 Structural performance

2.1 KeyBEMO 305 and 400 Profiled Roof Systems sheets have adequate strength and stiffness to sustain specified loads. Load/span tables are shown in Table 1.

Table 1 Maximum permissible snow and wind load<sup>(1)</sup> (kNm<sup>-2</sup>)

Sheet thickness (mm)	Span (m)				
	1.0	1.5	2.0	2.5	3.0
<b>KeyBEMO 305</b>					
	snow loads				
0.9	8.06	5.10	2.45	1.24	0.69
1.0	8.92	5.78	2.72	1.37	0.77
1.2	8.91	5.80	3.00	1.51	0.84
	wind loads				
0.9	8.09	4.45	2.72	1.85	1.32
1.0	8.98	5.62	3.36	2.24	1.58
1.2	8.99	5.88	3.70	2.47	1.74
<b>KeyBEMO 400</b>					
	snow loads				
0.9	6.14	4.00	2.85	1.55	0.86
1.0	6.79	4.42	3.06	1.55	0.86
	wind loads				
0.9	5.67	3.34	2.20	1.58	1.18
1.0	6.20	4.00	2.66	1.91	1.42

(1) Data relate to multi-span applications limited by:

- bending stress
- deflection of span/200 for snow loads
- deflection of span/90 for wind uplift.

2.2 The load/span data limited by halter height may override the stress and deflections load span tables (see Tables 2 and 3).

Table 2 Maximum span for halter height KeyBEMO 305 (all sheet thicknesses)

Halter height (mm)	Span (m)				
	1.0	1.5	2.0	2.5	3.0
140	7.68	5.11	3.81	3.05	2.53
160	7.33	4.89	3.64	2.90	2.41
180	6.89	4.59	3.42	2.73	2.26
200	4.96	3.30	2.45	1.95	1.62
220	3.23	2.15	1.59	1.26	1.05

Table 3 Maximum span for halter height KeyBEMO 400 (all sheet thicknesses)<sup>(1)</sup>

Halter height (mm)	Span (m)				
	1.0	1.5	2.0	2.5	3.0
140	5.85	3.90	2.91	2.36	1.93
160	5.56	3.73	2.78	2.22	1.84
180	5.25	3.51	2.61	2.08	1.73
200	3.78	2.52	1.87	1.49	1.23
220	2.46	1.63	1.21	0.96	0.80

(1) Data relate to multi-span applications limited by:

- factor of safety of 2 against uplift, with a material factor of 1.33 or
- factor of safety of 2 against downward load with a material factor of 1.1.

2.3 When evaluating the design loads, the wind loads must be calculated in accordance with the recommendations of BS 6399-2 : 1997 and the imposed snow loads must be checked in accordance with the recommendations of BS 6399-3 : 1988.

2.4 The sheets are capable of withstanding impacts associated with normal handling, installation and service conditions.

### 3 Condensation risk



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

3.2 The vapour control layer detail is not covered by this Certificate, but must be undamaged and continuous over ridges and hips and sealed at penetrations and abutments.

3.3 Guidance on the evaluation and control of internal atmospheric conditions is given in BS 5250 : 2002, BS 5720 : 1979 and BS 5925 : 1991.

### 4 Thermal insulation

The thermal properties of the roof system are not covered by this Certificate. The Certificate holder can supply assistance in the selection of suitable insulating materials.

### 5 Weathertightness

5.1 When installed in accordance with the Certificate holder's instructions and section 9 of this Detail Sheet, the systems are weathertight when used on roofs with finished slopes from 1.5° to 60° and within exposure conditions related to the maximum design wind pressures.

5.2 The weathertightness of the systems will not be affected by normal service deflection.

### 6 Performance in relation to fire



The KeyBEMO sheets have a notional AA designation as defined by BS 476-3 : 1958 provided the blanket insulation installed has a non-combustible designation when tested in accordance with BS 476-4 : 1970.

### 7 Maintenance

7.1 The systems should be inspected regularly (at least once a year) for accidental damage to the roof sheets, their coatings and for any build up of dirt and debris. Damage must be repaired and accumulated dirt and debris removed.

7.2 In industrial and marine environments 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.

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

## 8 Durability



8.1 The durability of the KeyBEMO sheets will depend upon the material or coating, the immediate environment, the aspect faced and their use.

8.2 Mill- or stucco-finished uncoated aluminium sheets must not come into contact with the materials listed below. Where problems of incompatibility are likely to occur, barriers (eg paints, bimetallic separation tapes or pads, appropriate to the materials and environment) should be incorporated:

*in any conditions*

- ungalvanized mild steel
- brass
- copper and its alloys
- timber treated with fire retardants
- mortar
- alkali-bearing materials

*in damp conditions*

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

*in marine environments*

- lead
- stainless steel

*in industrial environments*

- lead.

8.3 The stucco-embossed aluminium sheet will have a minimum service life of 40 years in rural and suburban areas and a minimum 25 years in more aggressive areas, eg severe industrial or marine environments.

8.4 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.

8.5 Maintenance painting may be necessary to restore the appearance of coated sheets or to extend their design life, and should be considered at the intervals given in Table 4. The Certificate holder can recommend a suitable system for maintenance painting. In addition specific requirements apply to mill- or stucco-finished uncoated aluminium (see section 8.2).

Table 4 Service life of coating

Sheet material	Minimum service life (years) <sup>(1)</sup> environment	
	rural or suburban	industrial or marine
Polyester-coated aluminium alloy	15 <sup>(2)</sup>	10 <sup>(2)</sup>
PVF <sub>2</sub> -coated aluminium alloy	20 <sup>(2)</sup>	15 <sup>(2)</sup>
ARS-coated aluminium alloy	20 <sup>(2)</sup>	15

(1) Minimum service life is that when first maintenance painting is required.  
 (2) Full details of coated materials are given in Certificate No 93/2922.

8.6 If the building has an exposed eaves detail, and is in an aggressive environment, or if there are corrosive conditions inside it, the specification of the reverse side coating should be discussed with the Certificate holder.

8.7 Colour changes of the coatings in general will be slight and uniform on any one elevation. More pronounced changes with colours of vermilion, golden yellow and silver metallic may occur.

## Installation

### 9 General

9.1 Installation of the KeyBEMO 305 and 400 Profiled Roof Systems must be carried out by experienced roofing contractors trained and approved by the Certificate holder.

9.2 The liner sheets, vapour control layer and filler blocks are outside the scope of this Certificate. These should be laid in accordance with the manufacturer's instructions.

9.3 Once the liner is complete the halter and thermal barrier pads are fixed through the underlining sheets to the roof purlins. After careful positioning, both in line and level, according to the layout plan, the halters are fixed using the appropriate screws as specified in the Front Sheets.

9.4 The mineral wool quilts or semi-rigid mineral wool slabs are placed and eased over the halters.

9.5 The sheets are placed and the joints folded using either the KeyBEMO seaming tool or the KeyBEMO powered seaming machine supplied by the Certificate holder.

9.6 Each section must be seamed as soon as it has been laid. In this way, the full load carrying capacity and security against strong winds are assured for the system. (Normal assembly is from verge flashing to verge flashing.)

9.7 On completing the installation of the sheets, the ancillary components forming the various ridge, perimeter and eaves fittings are fixed.

9.8 Typical construction details are shown in Figures 3, 4 and 5.

Figure 3 Typical verge detail

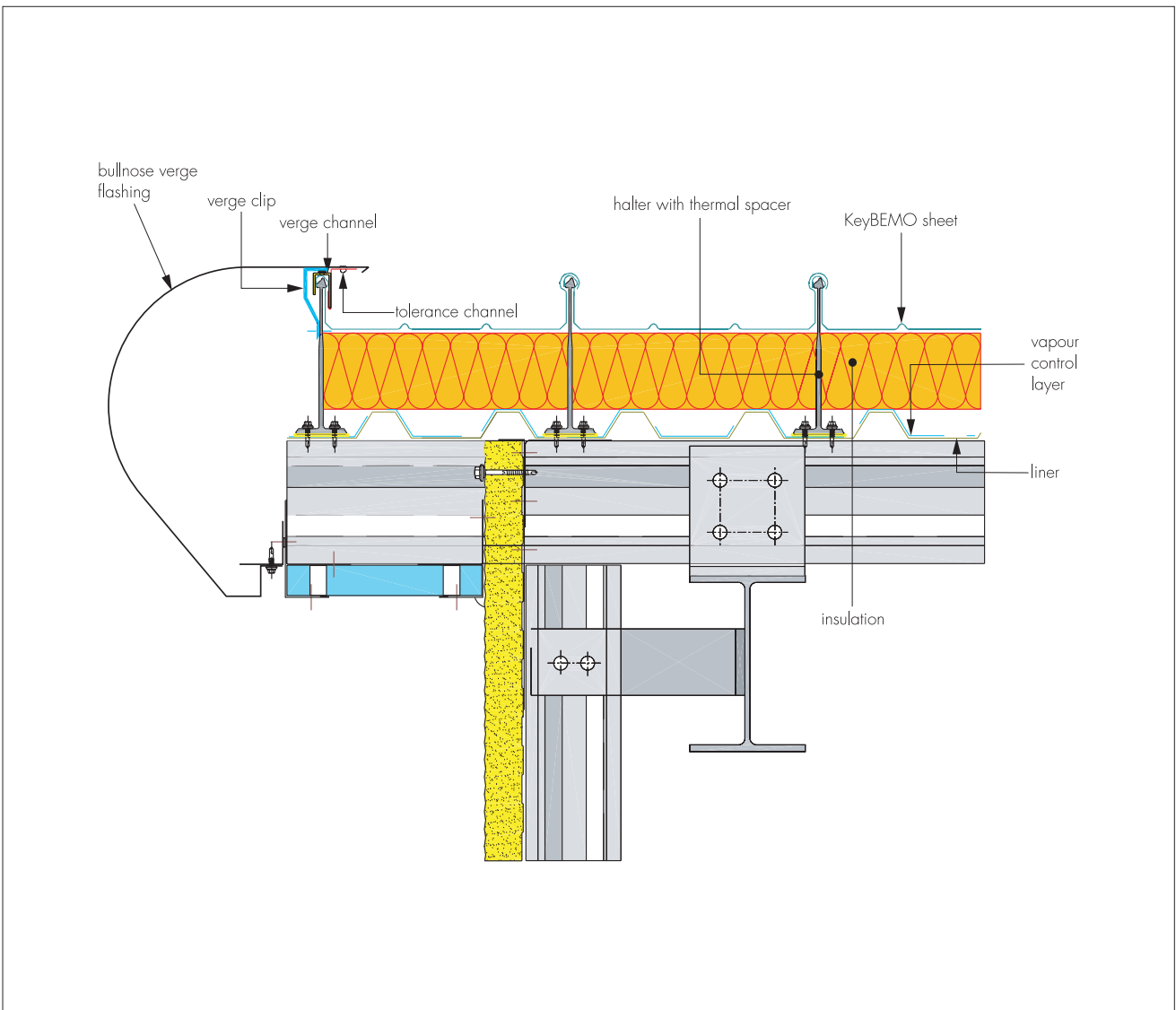


Figure 4 Typical ridge detail

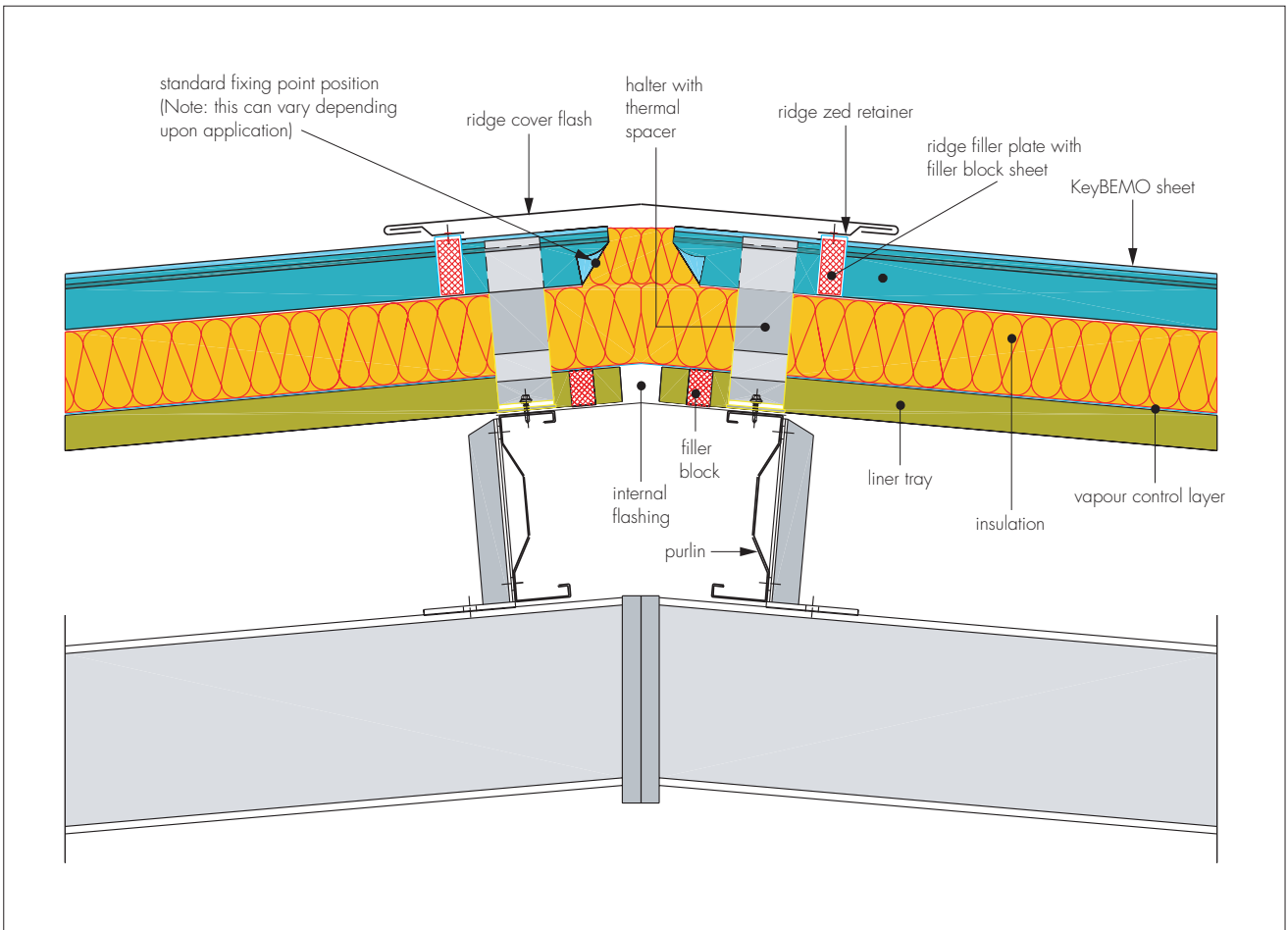
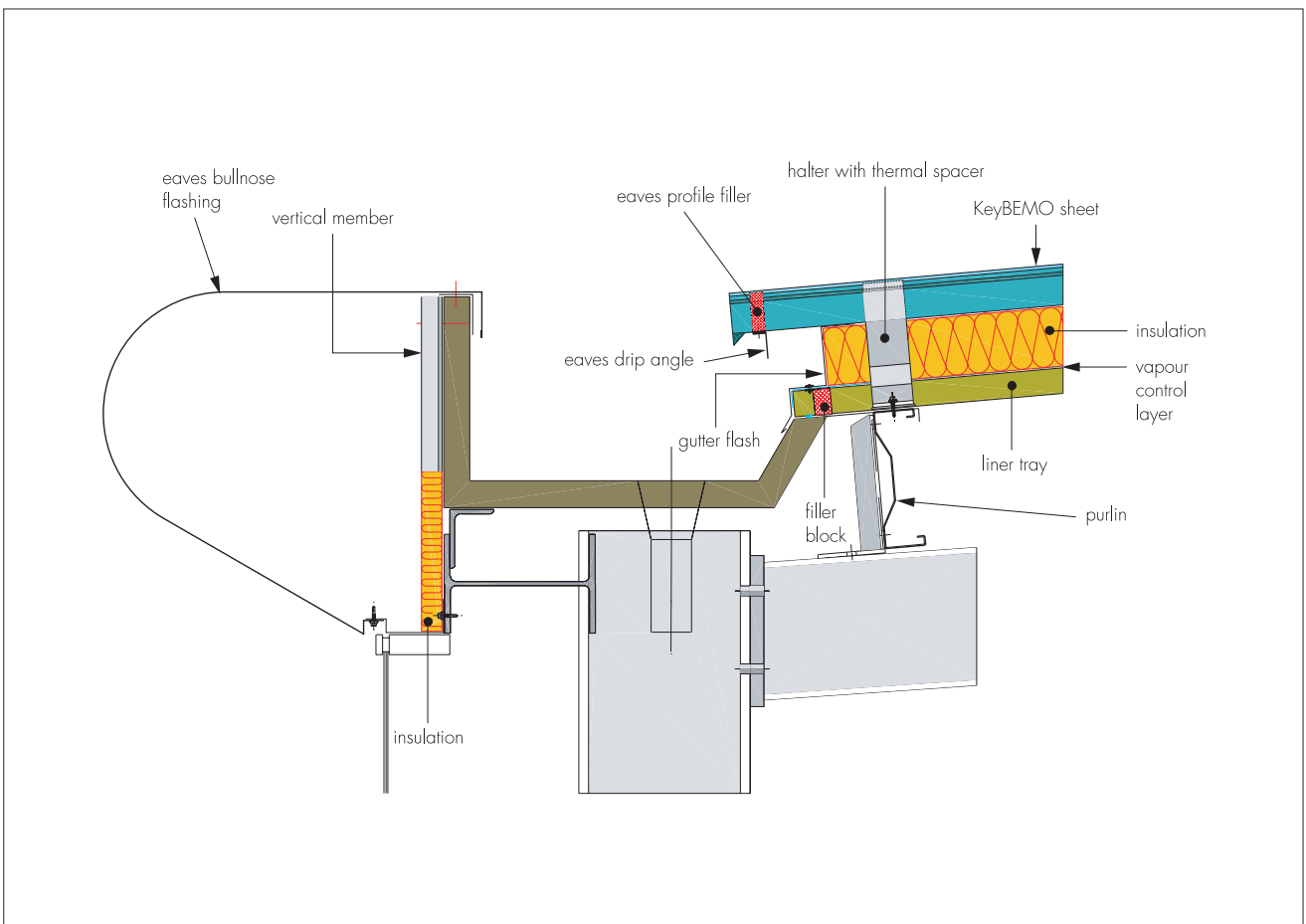


Figure 5 Typical eaves detail



## Technical Investigations

The following is a summary of the technical investigations carried out on the KeyBEMO 305 and 400 Profiled Roof Systems.

### 10 Tests

Tests were carried out on the product to establish:

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

### 11 Investigations

11.1 The manufacturing process was examined, including the methods adopted for quality control and details were obtained relating to the quality and composition of the material used.

11.2 An assessment was made of:

- fire resistance
- practicability of installation of cut sheets and site rolled sheets
- weathertightness of fixed cladding and details.

11.3 Existing information relating to durability of the system, performance in fire and compatibility of materials in contact has been examined.

11.4 Site visits were made to assess the practicability of installation.

## Bibliography

BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*

BS 476-4 : 1970 *Fire tests on building materials and structures — Non-combustibility test for materials*

BS 5250 : 2002 *Code of practice for control of condensation in buildings*

BS 5720 : 1979 *Code of practice for mechanical ventilation and air conditioning in buildings*

BS 5925 : 1991 *Code of practice for ventilation principles and designing for natural ventilation*

BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*

BS 6399-3 : 1988 *Loading for buildings — Code of practice for imposed roof loads*

BS EN 485-2 : 1995 *Aluminium and aluminium alloys — Sheet, strip and plate — Mechanical properties*

BS EN 573-3 : 1995 *Aluminium and aluminium alloys — Chemical composition and form of wrought products — Chemical composition*



On behalf of the British Board of Agrément

Date of Second issue: 25th January 2005

A handwritten signature in black ink, appearing to read 'P. C. Newson'.

Chief Executive

*\*Original Detail Sheet issued 30th March 2001. This revised version includes clarification of the scope of the Certificate to include use of the product for dwellings and reference to revised Standards.*

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