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Agrément Certificate No 98/3481

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Designated by Government to issue European Technical Approvals

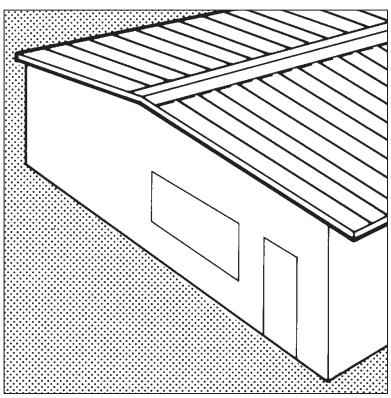
KAL-ZIP SECRET FIX ROOF SYSTEMS

Système de couverture
Dacheindeckungen

Product

- *THIS CERTIFICATE REPLACES CERTIFICATE No 88/2125 AND RELATES TO KAL-ZIP SECRET FIX ROOF SYSTEMS, COMPRISING PROFILED ALUMINIUM ALLOY (UNCOATED OR COATED) SHEETS AND ACCESSORIES FOR FIXING TO STEEL OR TIMBER SUBSTRUCTURES.*
- *The systems are for use as fully finished structural roofs with slopes from 1.5° to 60° where access is available for maintenance and repair only.*
- *The product is weathertight and structurally stable within the limits set out in this Certificate, and is intended to be fixed to steel or timber purlins and rafters.*

These Front Sheets must be read in conjunction with the accompanying Detail Sheets, which provide information specific to particular systems.



Building Regulations — Detail Sheet 1

1 The Building Regulations 1991 (as amended 1994) (England and Wales)

The Secretary of State has agreed with the British Board of Agrément aspects of performance to be used by the BBA in assessing the compliance of roof decks and waterproofing with the Building Regulations. In the opinion of the BBA, KAL-ZIP Secret Fix Roof Systems, if used in accordance with the provisions of this Certificate, will meet the relevant requirements.

Requirement:	A1	Loading
Comment:		KAL-ZIP Secret Fix Roof Systems have sufficient strength and stiffness to sustain and transmit the design load in accordance with section 2 of the relevant Detail Sheet.
Requirement:	B4	External fire spread
Comment:		The external surface of KAL-ZIP sheets can be taken to have a notional AA designation as defined by BS 476 : Part 3 : 1975 and therefore is not subject to the limitations of a minimum distance from any point on a boundary. See section 9 of the Front Sheets.
Requirement:	C4	Resistance to ground moisture and weather
Comment:		When subjected to the maximum design load given in section 2 of the relevant Detail Sheet and installed in accordance with sections 5 and 6 of the relevant Detail Sheet, the systems will resist passage of moisture to the inside of the building. See section 8 of these Front Sheets.
Requirement:	F2	Condensation in roofs
Comment:		A roof construction incorporating a system can be designed to satisfy this Requirement. See section 3 of the relevant Detail Sheet.
Requirement:	L1	Conservation of fuel and power
Comment:		When used with an adequate thickness of insulation, the system can meet the U values given in Tables 1 and 5 of the Approved Document providing the thermal bridging effect is taken into account. See section 4 of the relevant Detail Sheet.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The systems are acceptable. See section 10 of the Front Sheets.

2 The Building Standards (Scotland) Regulations 1990 (as amended)

In the opinion of the BBA, KAL-ZIP Secret Fix Roof Systems, if used in accordance with the provisions of this Certificate, will satisfy the various Regulations and Technical Standards as listed below.

Regulation:	10	Fitness of materials
Standard:	B2.1	Selection and use of materials and components
Comment:		The product is acceptable. See section 10 of the Front Sheets.
Regulation:	11	Structure
Standard:	C2.1	Construction
Comment:		The systems have sufficient strength and stiffness to transmit the design load in accordance with section 2 of the relevant Detail Sheet.

continued

continued

Regulation:	12	Structural fire precautions
Standard:	D2.5	Separation of roofs and rooflights from boundaries
Comment:		The KAL-ZIP sheets have an AA designation and when installed in accordance with this Certificate can satisfy this Standard. See section 9 of the Front Sheets.
Regulations:	17 and 18	Preparation of sites and resistance to moisture
Standard:	G3.1	Resistance to precipitation
Comment:		When subjected to the maximum design load given in section 2 of the relevant Detail Sheet and installed in accordance with sections 5 and 6 of the relevant Detail Sheet, the systems will resist the passage of moisture to the inside of the building. See section 8 of these Front Sheets.
Standard:	4.1	Interstitial condensation
Standard:	4.2	Surface condensation
Comment:		Roof constructions incorporating the systems can be designed to satisfy the requirements of these Standards. See section 3 of the relevant Detail Sheet.
Regulation:	22	Conservation of fuel and power
Standard:	J2.3	Elemental approach (Method 1)
Comment:		When used with an adequate thickness of thermal insulation, the roof systems can meet the U values given in the table to Standard J2.3. See section 4 of the relevant Detail Sheet.

3 The Building Regulations (Northern Ireland) 1994 (as amended 1995 and 1997)

In the opinion of the BBA, KAL-ZIP Secret Fix Roof Systems, if used in accordance with the provisions of this Certificate, will satisfy the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 10 of the Front Sheets.
Regulation:	C5	Resistance to ground moisture and weather
Comment:		When subjected to the maximum design load given in section 2 of the relevant Detail Sheet and installed in accordance with sections 5 and 6 of the relevant Detail Sheet, the systems will resist the passage of moisture to the inside of the building. See section 8 of these Front Sheets.
Regulation:	C7	Condensation
Comment:		Roof constructions incorporating the systems can be designed to satisfy the requirements of these Regulations. See section 3 of the relevant Detail Sheet.
Regulation:	D2	Stability
Comment:		The systems have sufficient strength and stiffness to sustain and transmit the design load in accordance with section 2 of the relevant Detail Sheet.
Regulation:	E8	External fire spread
Comment:		The external surface of the KAL-ZIP sheets can be taken to have a notional AA designation as defined by BS 476 : Part 3 : 1975 and therefore is not subject to the limitation of a minimum distance from any point on a boundary. See section 9 of the Front Sheets.
Regulation:	F2	Conservation of fuel and power
Comment:		When used with an adequate thickness of thermal insulation, the systems can meet the U values given in Table 1 of Technical Booklet F. See section 4 of the relevant Detail Sheet.

Technical Specification

4 Description

4.1 KAL-ZIP Secret Fix Roof Systems are coverings of interlocking profiled sheets attached to the roof substructure by special clips fixed by mechanical fasteners to the roof purlins or decking profile. No visible through fixing of the roof sheeting is required. Further details relating to the material specification and profile dimensions are given in section 1 of the relevant Detail Sheet.

4.2 The clips are fixed using fasteners bought in to specification. They are available from Hoogovens Aluminium Building Systems Ltd and are supplied with the system. They are available in various lengths to suit the insulation depth used (see section 4.3 of these Front Sheets).

4.3 Accessories used with the systems include:

Fixing clips (ST clips*) — extruded aluminium alloy ISO designated Al Mg1 Si Cu (6061 to BS 1474 : 1987)†, available in various heights to accommodate different thicknesses of insulation. There are two designs (see Figure 1):

Standard clip (base detail ST6, types L80 to L190) — tee section with six holes. Suitable for fastening to steel/aluminium purlins and structural decking profiles using the fasteners described below.

Clip STE (types L80 to L190) — tee section with two offset holes for fastening to timber purlins using the woodscrews described below.

*ST clips are isolated from the vapour control layer and substrates by a hollow polyamide thermal barrier pad (see Figure 1).

†BS 1474 : 1987 has been partially superseded by relevant part of BS EN 755. Further information should be sought from Hoogovens Aluminium Building Systems Ltd.

Fixings for ST clips

To steel/aluminium purlins — 6.3 mm diameter, austenitic stainless steel (AISI Grade 304), self-tapping or self-drilling fasteners complete with stainless steel or aluminium/EPDM bonded washers. Two fasteners are required for each ST clip. Thread type and length of fasteners dependent upon purlin thickness.

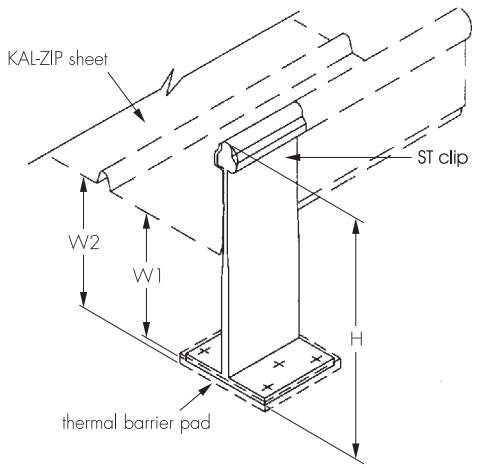
To timber purlins (minimum width 75 mm) — minimum 6.3 mm diameter, austenitic stainless steel (AISI Grade 304) self-tapping screws complete with 16 mm diameter stainless steel or aluminium/EPDM bonded washers. Two fixings are supplied per ST clip. Length dependent upon pull-out strength required and grade of timber used.

To structural mild steel profiled decking (minimum thickness 0.63 mm) — 5.2 mm diameter, aluminium Bulb-Tite type rivets with EPDM washers. Four rivets are required for each ST clip.

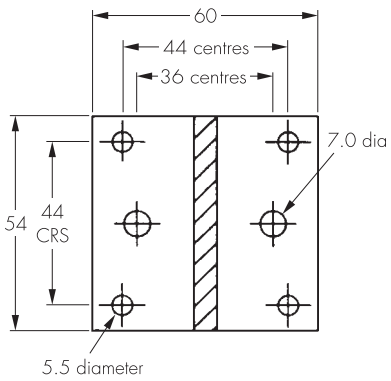
Gable end hooks

Extruded aluminium alloy to the same specification as that for the ST clips. The hook is fixed to the gable end ST clip by two 6.3 mm diameter, 19 mm long austenitic stainless steel (AISI Grade 304) self-tapping fasteners complete with stainless steel or aluminium/EPDM bonded washers (see Figure 2).

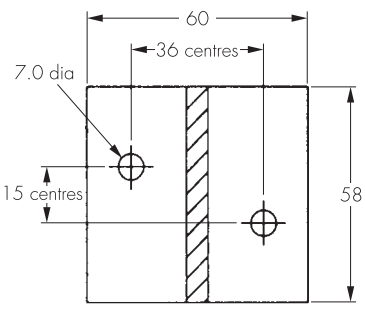
Figure 1 Fixing clips and thermal barrier



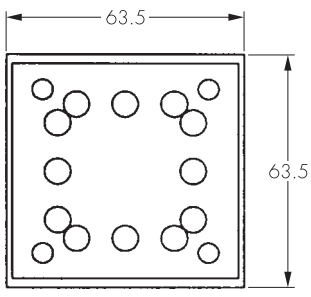
'L' range of ST clips			
Type	H	W1	W2
L80	136	75	80
L90	146	85	90
L100	156	95	100
L110	166	105	110
L120	176	115	120
L130	186	125	130
L140	196	135	140
L150	206	145	150
L190	246	185	190



standard clip base detail

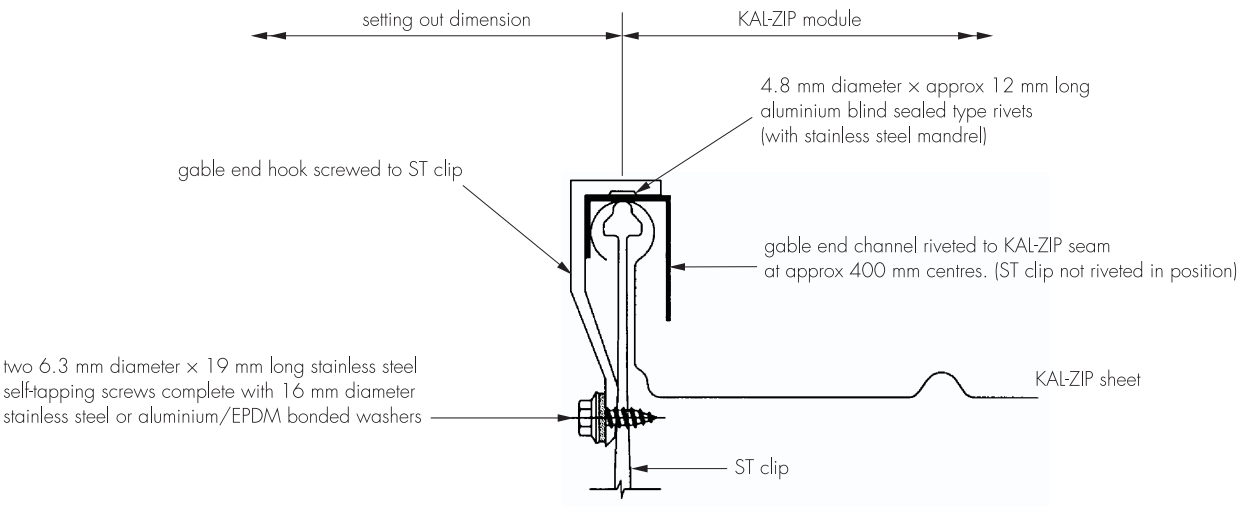


'E' Type clip base detail
(for fixing to min 75 mm wide timber purlins)

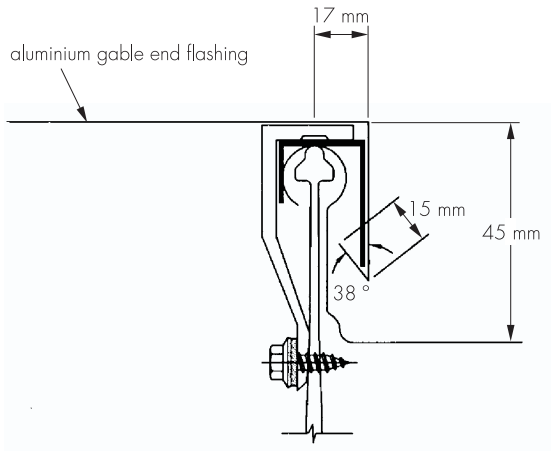


thermal barrier pad

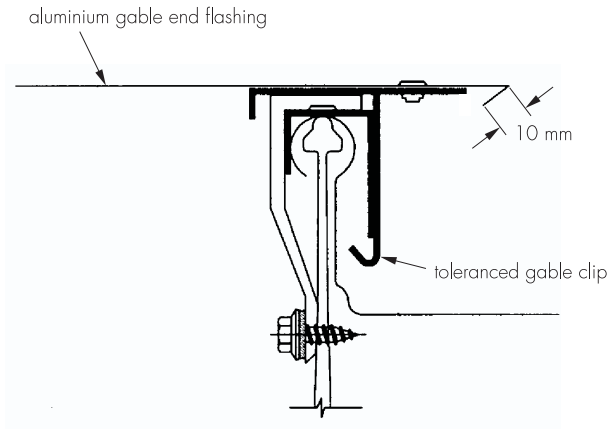
Figure 2 Gable end hooks



KAL-ZIP gable fixing detail



standard gable flashing detail



toleranced gable flashing detail

Gable end channel

Extruded aluminium alloy ISO designated Al Mg Si 0.5 (6063 to BS 1474 : 1987). The gable end channel is fixed to the KAL-ZIP seam at the verge position using 4.8 mm diameter by 12 mm long aluminium blind sealed type rivets (with stainless steel mandrels) at approximately 400 mm centres.

Underlining sheets

KAL-LINER aluminium liner sheets : Stucco embossed.

Natural finish aluminium, non-structural liner sheets of aluminium alloy EN AW 3004 (Al Mn1 Mg1) to BS EN 485-2 : 1995, EN AW-3004 (A1 Mn1 Mg1) Alclad or Hogal 5555 (similar to A1 Mg2.7 Mn) ALCLAD.

Alclad alloys are clad with aluminium alloy AA7072 (Al Zn1) to a minimum of 4% of core thickness on both sides. KAL-LINER sheets are compatible with the cover width dimensions of the KAL-ZIP sheets (see relevant Detail Sheets). The durability of the Hogal 5555 substrate is outside the scope of this Certificate.

Colour coated finish liner sheets are manufactured from aluminium alloy EN AW-3004 (Al Mn1 Mg1). Colour coating is available in polyester, PVF_2, ARS as described in BBA Certificate No 93/2922.

- KAL-LINER galvanized steel liner sheets: steel liner sheet to BS EN 10142 : 1991 used in the same format as above, replacing the aluminium liner sheet — can be supplied in plain galvanized finish, or with plastisol, PVF_2 or polyester colour coating. Durability of the steel substrate and coating are outside the scope of this Certificate.
- KAL-DEK galvanized structural steel decking to BS EN 10147 : 1992 : spans rafter to rafter and is normally used to replace use of purlin structure. The spanning capabilities can be determined from the manufacturer's published load/span tables. The structural adequacy and durability of the steel substrates are outside the scope of this Certificate.

Vapour control layer

- KAL-FLEX CLEAR reinforced virgin polyethylene sheet with minimum thickness of 0.25 mm, or
- KAL-FLEX FOIL aluminium foil (encapsulated) : reinforced virgin polyethylene sheet with a minimum thickness of 0.350 mm.

Blanket insulation

- KAL-THERM mineral wool or glass-fibre quilts : available in thicknesses of 60 mm, 80 mm, 100 mm, 120 mm and 150 mm which can be used to make up required insulation thicknesses as shown in the relevant Detail Sheets. The blanket must be non-combustible in accordance with BS 476 : Part 4 : 1970(1984) and have a maximum thermal conductivity of 0.037 $Wm^{-1}K^{-1}$.

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

Eaves and ridge closure pieces

closed cell, cross-linked polyethylene foam with a minimum density of 30 kgm^{-3}, or

closed cell EPDM with a minimum density of 150 kgm^{-3}, or

closed cell, cross-linked polyethylene foam faced with EPDM (overall minimum density of 40 kgm^{-3}).

Flashings

made to order and outside the scope of this Certificate, but must be made of the same material finish as the KAL-ZIP sheets and fastened generally with aluminium rivets with stainless steel mandrel, used in such places as verge, ridge and eaves details.

Sealant

low modulus silicon rubber type which must be gun-applied; elastic, waterproof and non-corrosive, supplied or approved by Hoogovens Aluminium Building Systems Ltd.

4.5 Openings to details such as vents, PVC or GRP rooflights, can be incorporated in the KAL-ZIP Roof System but are outside the scope of this Certificate.

4.6 Quality control checks include:

aluminium components
dimensions
chemical composition
mechanical properties
coating thicknesses
finished panel dimensions.

4.7 The closure pieces for the eaves and the ridge are bought in from outside suppliers to Hoogovens Aluminium Building Systems Ltd's specification and are subject to visual and dimensional quality control checks.

5 Delivery and handling

5.1 KAL-ZIP sheets of the required length are delivered to site on pallets, each carrying a label bearing the BBA identification mark incorporating the number of this Certificate; loads must not project more than 4 m at each end. When lifting pallets, the braces or ropes must have edge protection. A spreader beam must be used to unload lengths exceeding 12 m. If the sheets are not required immediately, the pallets should be stored on firm, level ground preferably under cover in dry, dust-free conditions with adequate ventilation. Pallets must not be stacked.

5.2 The durability of the roof system will be dependent on the vapour control layer being undamaged before or during installation, therefore the handling and storage of these items should be in accordance with the following recommendations:

Liner and Decking Sheets — should be handled in the same manner as for the KAL-ZIP sheets.

Vapour control layer — the rolls 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 ultra-violet light indoors or under non-translucent covers. The vapour control layer should be dry during installation.

Blanket insulation — delivered to site in polythene wrapped rolls. For long-term protection they must be stored indoors or under a waterproof covering.

Design Data

6 General

6.1 KAL-ZIP Secret Fix Roof Systems are satisfactory for use as a structural roof system, with slopes from 1.5° to 60°, where access is available for maintenance and repair only.

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

7 Weathertightness

7.1 When installed in accordance with the manufacturer's instructions and sections 5 and 6 of the relevant Detail Sheet, the system is weathertight when used on roofs with finished slopes of from 1.5° to 60° and within exposure conditions related to recommended maximum design wind pressures.

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

8 Performance in relation to fire

The KAL-ZIP sheets have a notional AA designation as defined by BS 476 : Part 3 : 1975 provided the blanket insulation installed has a 'non-combustible' classification when tested in accordance with BS 476 : Part 4 : 1970(1984).

9 Maintenance

9.1 The systems should be inspected regularly (at least once a year) for accidental damage to the roof sheets, 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.

9.2 In industrial and marine 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.

9.3 Damaged sheets can be removed and replaced. Hoogovens Aluminium Building Systems Ltd should be contacted for details.

10 Durability

10.1 The durability of KAL-ZIP sheets will depend upon the coating material, the immediate environment, aspect faced and use. Colour changes will be slight and uniform on any one elevation.

10.2 When used in the context of this Certificate, uncoated aluminium KAL-ZIP sheets will have the minimum service life given in section 10.9.

10.3 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 1.

10.4 For coated KAL-ZIP 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. Details can be obtained from the manufacturer.

10.5 A planned maintenance cycle (see section 9 of these Front Sheets) should be introduced if any extended design life is required. The manufacturer can recommend a suitable system for maintenance painting. In addition, specific requirements apply to stucco-finished uncoated aluminium (see section 10.8).

10.6 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.

10.7 Drainage from copper onto the sheets is to be avoided but drainage from the sheets onto copper is acceptable.

10.8 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.

10.9 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 25 years in more aggressive areas, eg severe industrial or marine environments.

Table 1 Service life

Sheet material	Minimum service life (years)[1]	
	Environment	
	Rural or suburban	Industrial or marine
Polyester coated aluminium alloy[2]	15	10
PVF_2 coated aluminium alloy[2]	20	15
ARS coated aluminium alloy[2]	20	15[3]

(1) Minimum service life is that when first maintenance painting is required.
(2) Full details of coated materials are given in BBA Certificate No 93/2922.
(3) This value is not given in Certificate No 93/2922, but has been individually assessed.

Installation

11 General

11.1 Installation is carried out by experienced roofing contractors trained and approved by Hoogovens Aluminium Building Systems Ltd.

11.2 Liner or decking sheets are placed in position with all joints lapped, stitched and sealed (where necessary) and fixed to the roof purlins/rafters. Solid filler blocks are located in the liner or decking profile at details such as eaves, hips and ridges. Side and end laps are sealed (where necessary) with synthetic rubber sealing strip and stitched with aluminium or stainless steel blind-sealed or Bulb-Tite rivets or stainless steel stitching screws.

11.3 Swarf or debris is removed from the liner or decking before being covered by the vapour control layer (VCL) sheets, which are laid in the same direction as the liner/decking sheets and made continuous by lapping all joints by a minimum 50 mm and sealing with KAL-FLEX butyl rubber VCL sealing tape. The VCL sheets should be continuous over ridges/hips and sealed to penetration/abutments.

11.4 ST clips and thermal barrier pads are fixed through the underlining sheets to the roof purlins after marking out their positions.

11.5 The mineral wool blanket is then placed and eased over the ST clips.

11.6 The KAL-ZIP sheets are installed and joints secured using the powered 'zipper' tool supplied by Hoogovens Aluminium Building Systems Ltd.

11.7 When splicing two sheets (see Figures 3 and 4), 6.3 mm diameter stainless steel screws or aluminium rivets should be used in conjunction with the sealant. For roof pitches lower than 3° a continuously welded joint is necessary.

11.8 On completing the installation of the sheets, the various ridge, perimeter and eaves fittings are fixed.

11.9 Typical construction details are shown in Figures 3 to 8 of these Front Sheets.

Figure 3 Joint at fixed point

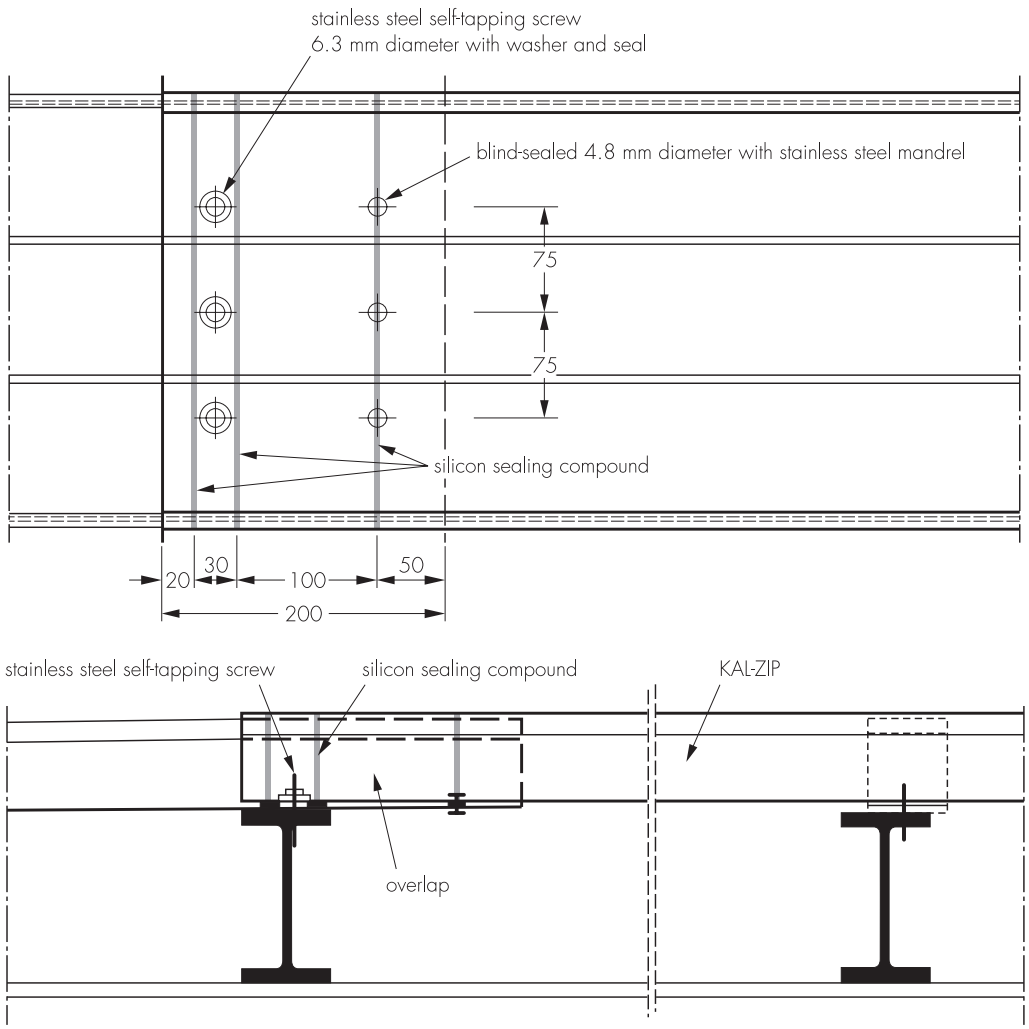


Figure 4 Floating joint

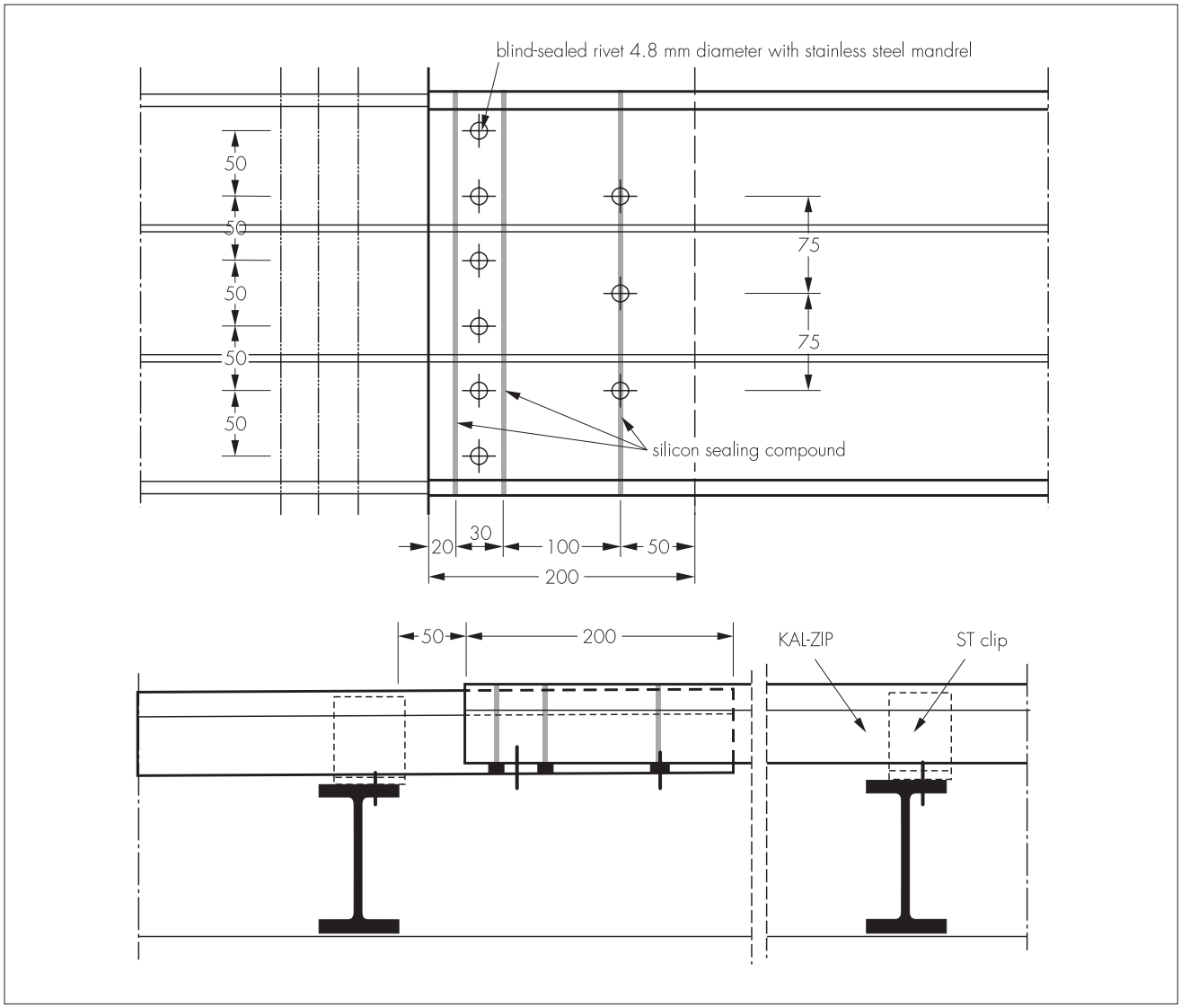


Figure 5 Double-skin ridge detail

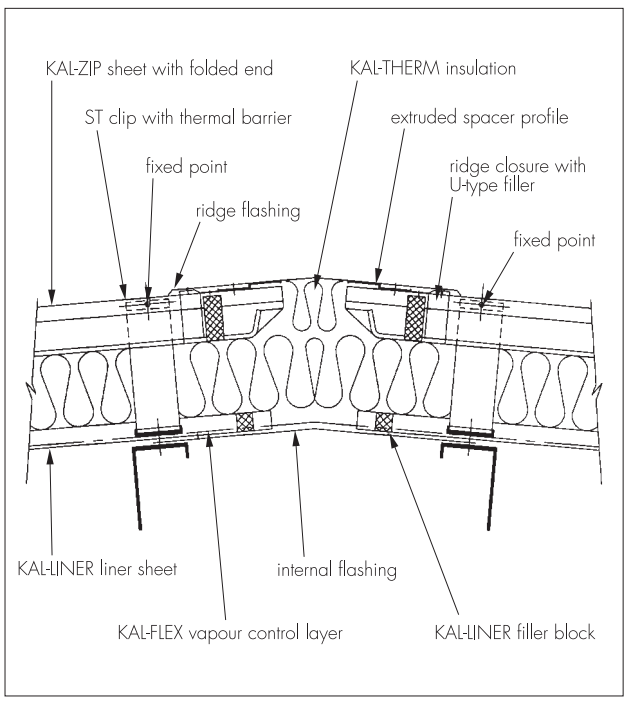


Figure 6 Double skin mono-ridge abutment to cladding and verge abutment to brickwork

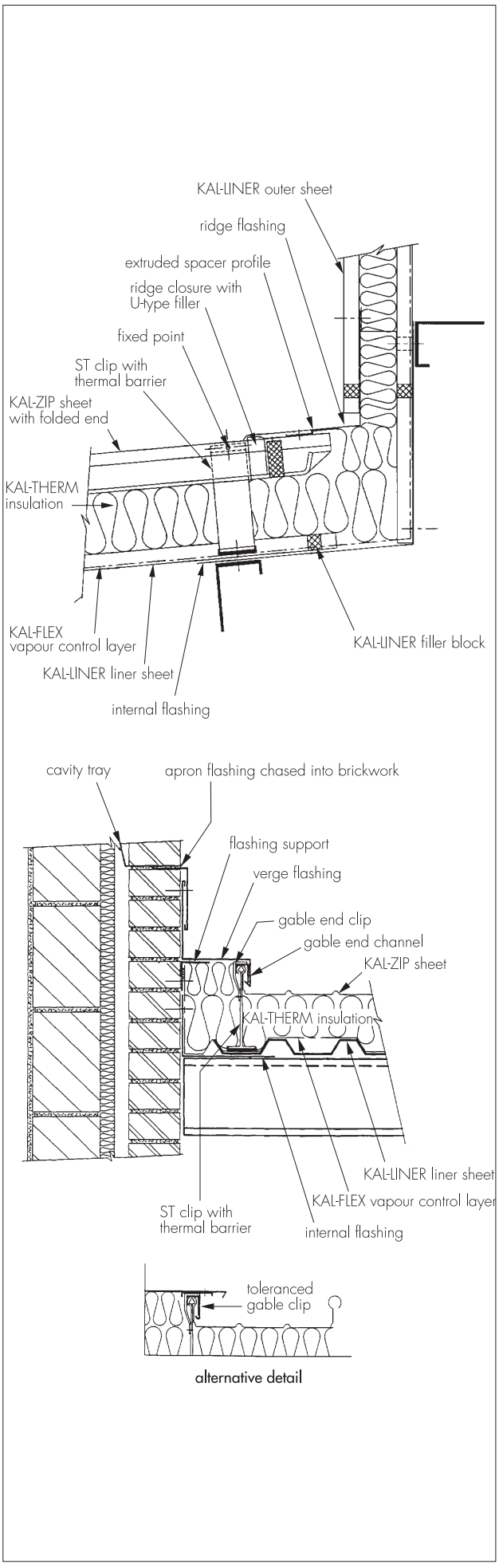


Figure 7 Unventilated eaves — double skin

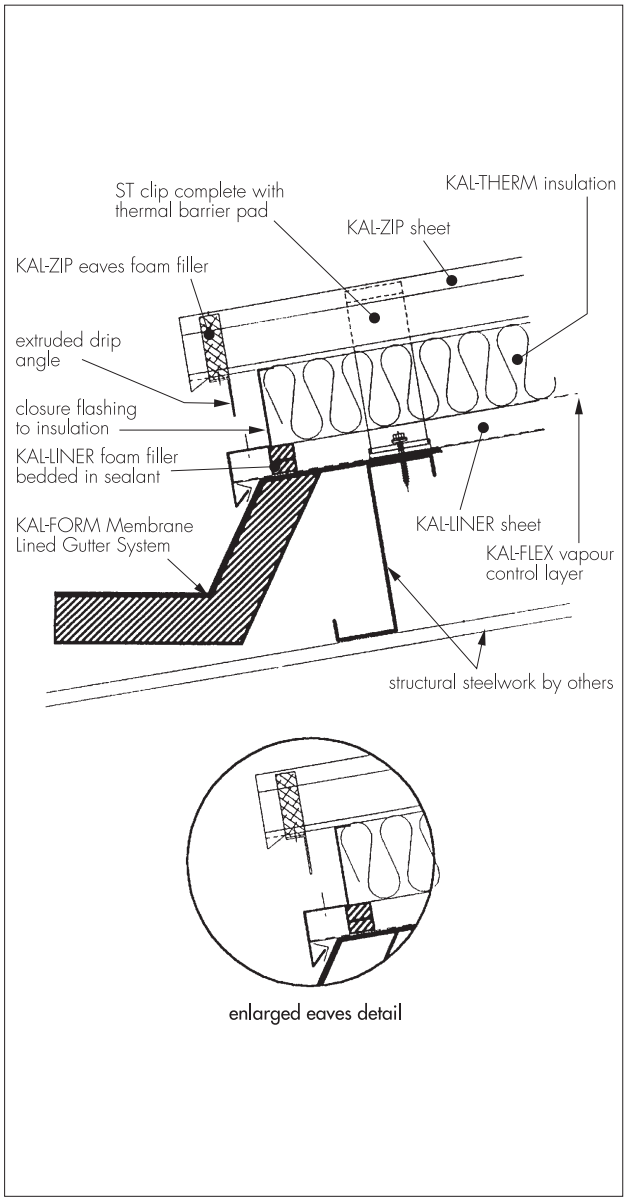
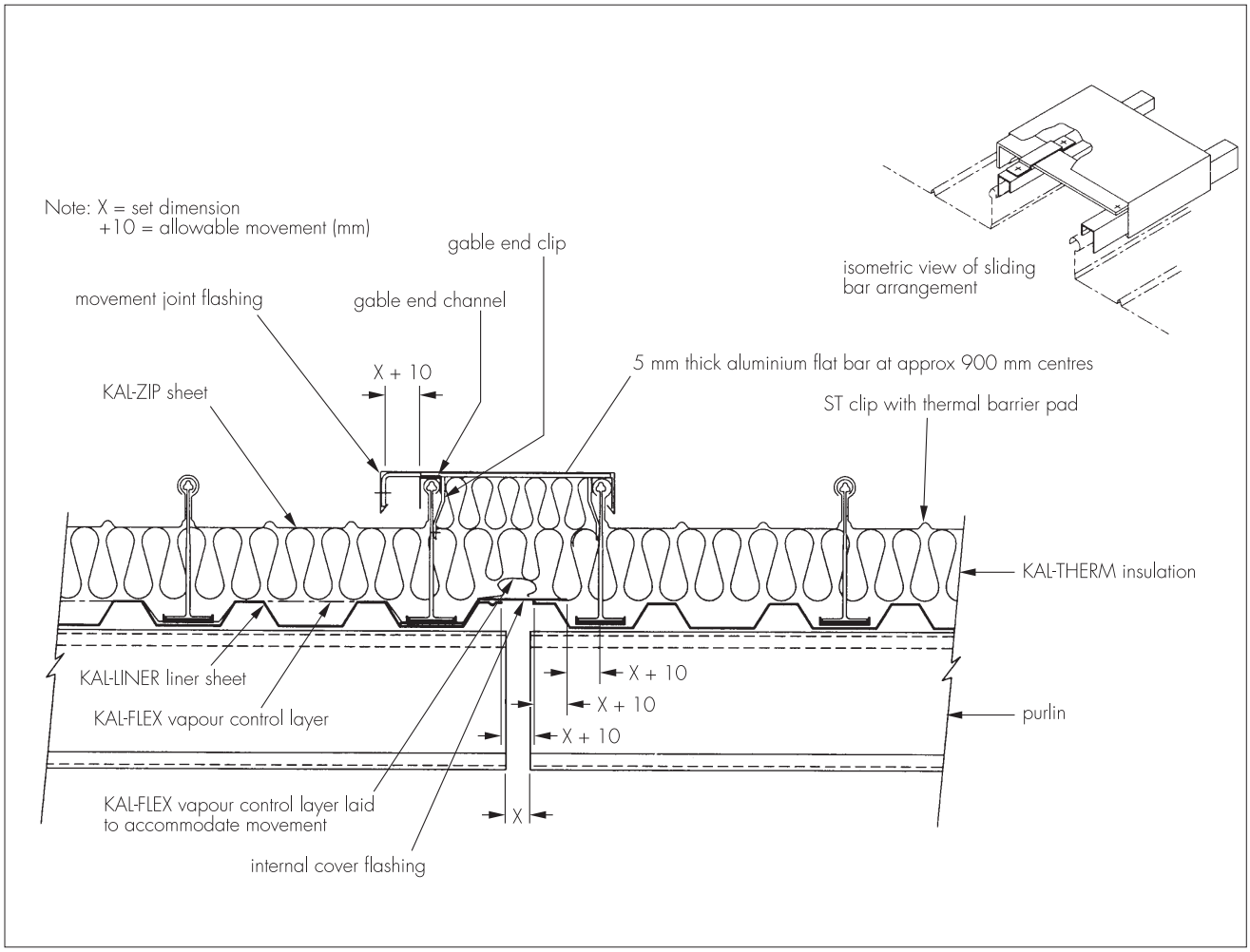


Figure 8 Building and movement joint detail



Bibliography

BS 476 *Fire tests on building materials and structures*
Part 3 : 1975 *External fire exposure roof test*
Part 4 : 1970(1984) *Non-combustibility test for materials*

BS 1474 : 1987 *Specification for wrought aluminium and aluminium alloys for general engineering purposes: bars, extruded round tubes and sections*

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

BS EN 10142 : 1991 *Specification for continuously hot-dip zinc coated low carbon steel sheet and strip for cold forming: technical delivery conditions*

DIN 1725 *Aluminium alloys : Wrought alloys*

Conditions of Certification

12 Conditions

12.1 Where reference is made in this Certificate to any Act of Parliament, Regulation made thereunder, Statutory Instrument, Code of Practice, British Standard, manufacturer's instruction or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certificate.

12.2 The quality of materials and the method of manufacture have been examined and found satisfactory by the BBA and must be maintained to this standard during the period of validity of this Certificate. This Certificate will remain valid for an unlimited period provided:

(a) the specification of the product is unchanged; and

(b) the manufacturer continues to have the product checked by the BBA.

12.3 This Certificate will apply only to the product that is installed, used and maintained as set out in this Certificate.

12.4 In granting this Certificate, the BBA makes no representation as to:

(a) the presence or absence of patent or similar rights subsisting in the product; and

(b) the legal right of the Certificate holder to market, install or maintain the product; and

(c) the nature of individual installations of the product, including methods and workmanship.

12.5 It should be noted that any recommendations relating to the safe use of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory or Common Law Duties of care, or of any duty of care which exist at the date of this Certificate or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future statutory or Common law duties of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the use of this product.

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

In the opinion of the British Board of Agrément, KAL-ZIP Secret Fix Roof Systems are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 98/3481 is accordingly awarded to Hoogovens Aluminium Building Systems Ltd.

On behalf of the British Board of Agrément

Date of issue: 23rd March 1998

Director

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