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Agrément Certificate  
**02/3944**  
Product Sheet 1

### FAKRO ROOF WINDOWS

#### FAKRO FT CENTRE PIVOT ROOF WINDOWS

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Fakro FT Centre Pivot Roof Windows, for use on roofs of domestic and non-domestic buildings with a pitch between 15° and 90°, to provide natural light and ventilation.

(1) Hereinafter referred to as 'Certificate'.

#### CERTIFICATION INCLUDES:

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



#### KEY FACTORS ASSESSED

**Thermal insulation** — the windows have thermal transmittance values (U values) between 0.58 W·m<sup>-2</sup>·K<sup>-1</sup> and 1.5 W·m<sup>-2</sup>·K<sup>-1</sup>, depending on the glazing unit (see section 7).

**Weathertightness** — the windows can be used in the exposure situations described in this Certificate (see section 8).

**Structural stability** — the products can be selected to have adequate resistance to wind loads calculated in accordance with BS EN 1991-1-4 : 2005 and its National Annex (see section 9).

**Ventilation** — the windows can provide rapid ventilation and background ventilation (see section 10).

**Behaviour in relation to fire** — the glazing used in the windows can be considered as non-combustible material. Windows can be considered for emergency egress (see section 11).

**Durability** — the life of the roof windows is expected to be at least equal to conventional timber windows. Any slight external colour change or surface dulling of the aluminium covers that might occur will be uniform over the visible surfaces of the windows (see section 18).

The BBA has awarded this Certificate to the company named above for the products described herein. These products 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 Second issue: 13 March 2015

John Albon — Head of Approvals  
Construction Products

Claire Curtis-Thomas  
Chief Executive

Originally certificated on 27 November 2002

*The BBA is a UKAS accredited certification body — Number 1113. 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](http://www.bbacerts.co.uk)*

*Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.*

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# Regulations

In the opinion of the BBA, Fakro FT Centre Pivot Roof Windows, 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)

<b>Requirement:</b>	<b>A1</b>	<b>Loading</b>
<b>Comment:</b>	The products will have sufficient strength and stiffness to sustain the imposed load. See sections 9.1 and 9.2 of this Certificate.	
<b>Requirement:</b>	<b>B1</b>	<b>Means of warning and escape</b>
<b>Comment:</b>	Windows of an appropriate size can be used as an escape route from floors not more than 4.5 m above ground level. See section 11.4 of this Certificate.	
<b>Requirement:</b>	<b>B2</b>	<b>Internal fire spread (linings)</b>
<b>Comment:</b>	The glazing used in the products can be regarded as non-combustible material and, therefore, can be taken as having a Class 0 Classification. See section 11.1 of this Certificate.	
<b>Requirement:</b>	<b>B4(2)</b>	<b>External fire spread</b>
<b>Comment:</b>	When used in roof windows, unwired glass at least 4 mm thick can be regarded as having an AA designation. See section 11.2 of this Certificate.	
<b>Requirement:</b>	<b>C2(b)</b>	<b>Resistance to moisture</b>
<b>Comment:</b>	The windows will resist weather ingress. See sections 8.1 and 8.2 of this Certificate.	
<b>Requirement:</b>	<b>C2(c)</b>	<b>Resistance to moisture</b>
<b>Comment:</b>	The windows can contribute to satisfying this Requirement. Vents, where fitted, provide airflow to alleviate surface condensation. See sections 10.1, 10.2, 10.3 and 13 of this Certificate.	
<b>Requirement:</b>	<b>F1(1)</b>	<b>Means of ventilation</b>
<b>Comment:</b>	In assessing the contribution of the products to natural purge ventilation, the area of opening given in section 10.1 of this Certificate should be related to floor area as set out in Approved Document F. Background ventilation is provided by vents incorporated in the windows, where fitted. See sections 10.2 and 10.3 of this Certificate.	
<b>Requirement:</b>	<b>K</b>	<b>Protection from falling, collision and impact</b>
<b>Requirement:</b>	<b>K4(a)(b)</b>	<b>Protection against impact with glazing (applicable to England only)</b>
<b>Comment:</b>	Glazing less than 800 mm above floor level should satisfy the requirements of K4 or should comply with the requirements of BS EN 12600 : 2002. See section 14.3 of this Certificate.	
<b>Requirement:</b>	<b>K5.3</b>	<b>Safe opening and closing of windows etc (applicable to England only)</b>
<b>Comment:</b>	This Requirement can be satisfied. See section 14.2 of this Certificate.	
<b>Requirement:</b>	<b>K5.4</b>	<b>Safe access for cleaning windows etc (applicable to England only)</b>
<b>Comment:</b>	This Requirement can be satisfied. See section 14.1 of this Certificate.	
<b>Requirement:</b>	<b>L1(a)(i)</b>	<b>Conservation of fuel and power</b>
<b>Comment:</b>	In calculating the heat loss through windows, the U values given in section 7 of this Certificate should be used. The products can also contribute to daylighting and solar transmittance (see section 12 of this Certificate).	
<b>Requirement:</b>	<b>N1</b>	<b>Protection against impact (applicable to Wales only)</b>
<b>Comment:</b>	Glazing less than 800 mm above floor level should satisfy the requirements of N1 or should comply with the requirements of BS EN 12600 : 2002. See section 14.3 of this Certificate.	
<b>Requirement:</b>	<b>N3</b>	<b>Safe opening and closing of windows, skylights and ventilators (applicable to Wales only)</b>
<b>Comment:</b>	In buildings other than dwellings, windows which can be opened by people in or about the building should be constructed or equipped so that they can be opened, closed or adjusted safely. See section 14.2 of this Certificate.	
<b>Requirement:</b>	<b>N4</b>	<b>Safe access for cleaning windows etc (applicable to Wales only)</b>
<b>Comment:</b>	This Requirement can be satisfied. See section 14.1 of this Certificate.	
<b>Regulation:</b>	<b>7</b>	<b>Materials and workmanship</b>
<b>Comment:</b>	The products are acceptable. See sections 18.1, 18.2, 18.4, 18.5 and 18.6 and the <i>Installation</i> part of this Certificate.	
<b>Regulation:</b>	<b>26</b>	<b>CO<sub>2</sub> emission rates for new buildings</b>
<b>Regulation:</b>	<b>26A</b>	<b>Fabric energy efficiency rates for new dwellings (applicable to England only)</b>
<b>Regulation:</b>	<b>26A</b>	<b>Primary energy consumption rates for new buildings (applicable to Wales only)</b>
<b>Regulation:</b>	<b>26B</b>	<b>Fabric performance values for new dwellings (applicable to Wales only)</b>
<b>Comment:</b>	The products can contribute to satisfying these Regulations. See section 7 of this Certificate.	



## The Building (Scotland) Regulations 2004 (as amended)

<b>Regulation:</b>	<b>8(1)(2)</b>	<b>Durability, workmanship and fitness of materials</b>
<b>Comment:</b>	The products satisfy the requirements of this Regulation. See sections 17.2, 17.4, 17.5, 18.1, 18.2, 18.4, 18.5 and 18.6 and the <i>Installation</i> part of this Certificate.	
<b>Regulation:</b>	<b>9</b>	<b>Building standards applicable to construction</b>
<b>Standard:</b>	<b>1.1(b)</b>	<b>Structure</b>
<b>Comment:</b>	The products will have sufficient strength and stiffness to sustain the imposed loads, with reference to clause 1.1.1 <sup>(1)(2)</sup> , 1.1.2 <sup>(1)(2)</sup> and 1.1.3 <sup>(1)(2)</sup> . See sections 9.1 and 9.2 of this Certificate.	

Standard:	2.5	Internal linings
Comment:		The glazing used in the products can be regarded as non-combustible material and, therefore, can be taken as having a Class A1 Classification with reference to 2.5.1 <sup>(1)(2)</sup> . See section 11.1 of this Certificate.
Standard:	2.8	Spread from neighbouring buildings
Comment:		When used in roof windows, glass at least 4 mm thick is classified as 'low vulnerability' material, with reference to clause 2.8.1 <sup>(1)(2)</sup> . See section 11.3 of this Certificate.
Standard:	2.9	Escape
Comment:		Windows of an appropriate size can be used as an escape route from an apartment on an upper storey at a height of not more than 4.5 m above ground level, with reference to clause 2.9.4 <sup>(1)</sup> . See section 11.4 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The products will resist weather ingress, with reference to clause 3.10.1 <sup>(1)(2)</sup> . See sections 8.1 and 8.2 of this Certificate.
Standard:	3.14	Ventilation
Comment:		In calculating the contribution of the windows to natural ventilation to this Standard, with reference to clause 3.14.1 <sup>(1)(2)</sup> , see section 10.1 of this Certificate. Trickle ventilation, with reference to clauses 3.14.3 <sup>(2)</sup> and 3.14.5 <sup>(1)</sup> , is provided by vents incorporated in the windows, where fitted. See sections 10.1 and 10.2 of this Certificate.
Standard:	3.15	Condensation
Comment:		The windows can contribute to satisfying this Standard with reference to clauses 3.15.1 <sup>(1)(2)</sup> , 3.15.2 <sup>(1)(2)</sup> and 3.15.4 <sup>(1)(2)</sup> . See section 13 of this Certificate. Vents, where fitted, will provide airflow to alleviate surface condensation with reference to clause 3.15.4 <sup>(1)(2)</sup> . See sections 10.2 and 13 of this Certificate.
Standard:	3.16	Natural lighting
Comment:		In calculating the contribution of the windows to natural lighting to this Standard, with reference to clauses 3.16.1 <sup>(1)</sup> and 3.16.3 <sup>(1)</sup> , see section 12 of this Certificate.
Standard:	4.8(b)	Danger from accidents
Comment:		Glazing must comply with BS 6262-4 : 2005 where accidental collision with it is likely, in order to satisfy this Standard with reference to clause 4.8.2 <sup>(1)(2)</sup> . See section 14.3 of this Certificate.
Standard:	4.8(c)	Danger from accidents
Comment:		The products can be safely cleaned from inside the building, with reference to clause 4.8.3 <sup>(1)(2)</sup> . See section 14.1 of this Certificate.
Standard:	6.1(a)(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		In calculating the heat loss through windows, the U values given in section 7 of this Certificate should be used.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The products can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. In addition, the products can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ], 7.1.6 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ] and 7.1.7 <sup>(1)(2)</sup> [Aspect 1 <sup>(1)(2)</sup> ]. See section 7 of this Certificate.
Regulation:	12	<b>Building standards applicable to conversions</b>
Comment:		All comments given for these windows under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



## The Building Regulations (Northern Ireland) 2012

Regulation:	23	<b>Fitness of materials and workmanship</b>
Comment:		The products are acceptable. See sections 18.1, 18.2, 18.4, 18.5 and 18.6 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	<b>Resistance to moisture and weather</b>
Comment:		The products will not adversely affect the resistance of the roof to the passage of moisture. See sections 8.1 and 8.2 of this Certificate.
Regulation:	30	<b>Stability</b>
Comment:		The products will have sufficient strength and stiffness to sustain the imposed load. See sections 9.1 and 9.2 of this Certificate.
Regulation:	33	<b>Means of escape</b>
Comment:		Windows of an appropriate size can be used as an escape route in dwellings. See section 11.4 of this Certificate.
Regulation:	34	<b>Internal fire spread – Linings</b>
Comment:		The glazing used in the roof windows can be regarded as non-combustible material and therefore can be taken as having a Class 0 Classification. See section 11.1 of this Certificate.
Regulation:	36(b)	<b>External fire spread</b>
Comment:		When used in roof windows, unwired glass at least 4 mm thick can be regarded as having an AA designation. See section 11.2 of this Certificate.
Regulation:	39(a)(i)	<b>Conservation measures</b>
Regulation:	40(2)	<b>Target carbon dioxide emission rate</b>
Comment:		In calculating the heat loss through windows, the U values given in section 7 of this Certificate should be used.

Regulation:	65(1)	<b>Means of ventilation</b>
Comment:	When calculating the area of window openings for ventilation purposes, see section 10.1 of this Certificate. Trickle ventilation is provided by the vents incorporated in the windows, where fitted. See sections 10.2 and 10.3 of this Certificate.	
Regulation:	96	<b>Impact with glazing</b>
Comment:	Where people are likely to come into contact with glazing in a building the requirements of this Regulation shall be deemed to be satisfied if the glazing complies with Technical Booklet V, Section 2. See section 14.3 of this Certificate.	
Regulation:	98	<b>Safe opening and closing of windows, skylights and ventilators</b>
Comment:	Any window which can be opened by a person shall be so constructed or equipped that it may be opened, closed and adjusted safely. The requirements of this Regulation shall be deemed to be satisfied if the window complies with Technical Booklet V, Section 4. See section 14.2 of this Certificate.	
Regulation:	99	<b>Safe means of access for cleaning glazing</b>
Comment:	Reasonable provision shall be made for safe means of access to clean glazing. The requirements of this Regulation shall be deemed to be satisfied if the means of access complies with Technical Booklet V, Section 5. See section 14.1 of this Certificate.	

## Construction (Design and Management) Regulations 2007

## Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 3 *Delivery and site handling* (3.4) and 14 *Safety* (14.4) of this Certificate.

## Additional Information

### NHBC Standards 2014

NHBC accepts the use of the Fakro FT Centre Pivot Roof Windows, if installed, used and maintained in accordance with this Certificate in relation to *NHBC Standards*, Chapter 6.7 *Doors, windows and glazing*.

### CE marking

The Certificate holder has taken the responsibility of CE marking the products in accordance with harmonised European Standard BS EN 14351-1 : 2006.

## Technical Specification

### 1 Description

1.1 The range is made up of Fakro FT Centre Pivot Roof Windows (see Figures 1 to 6 of this Certificate) and comprises single-opening lights revolving around a centre pivot subject to the size restrictions shown in Table 1 of this Certificate.

1.2 Fakro FT Centre Pivot Roof Windows are fabricated from preserved softwood (either continuous timber or layer jointed material) frames and sashes, and feature coil-coated aluminium on the external faces and clear water-based acrylic lacquer on the internal faces of the frames and sashes.

1.3 Members of the outer frames and sashes are glued at the corners and additionally joined with quadruple and triple tenons respectively.

1.4 For conservation areas, FTP-V/C U3 and FTP-V/C L3 Conservation Roof Windows are available, which feature black coil-coated aluminium on the external faces and clear water-based acrylic lacquer on the internal faces; they are supplied complete with mullion (see Figure 7).

Figure 1 FTP-V U3 Centre Pivot Roof Window cross-sections

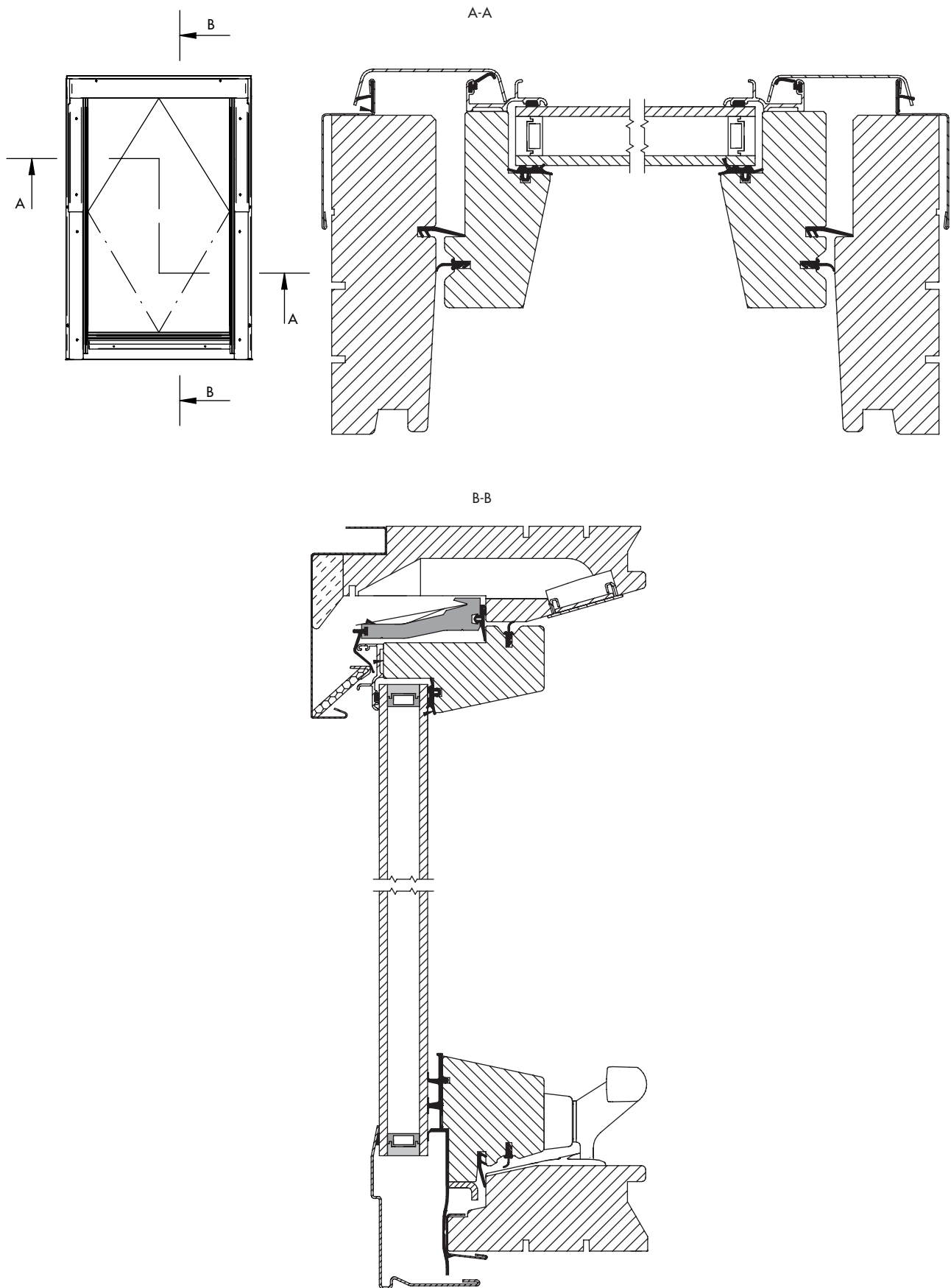


Figure 2 FTP-V L3 Centre Pivot Roof Window cross sections

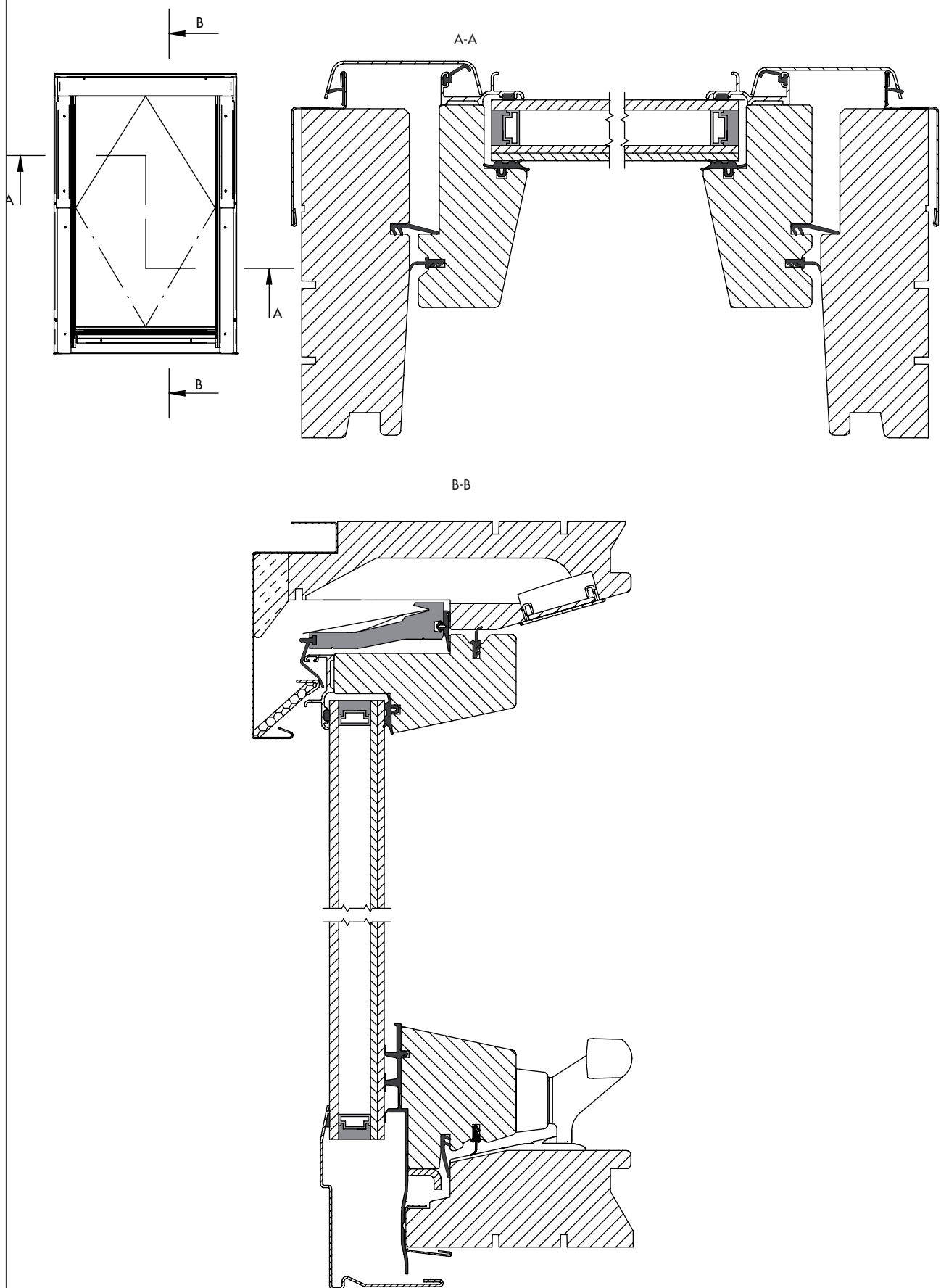


Figure 3 FTS-V U2 Centre Pivot Roof Window cross-sections

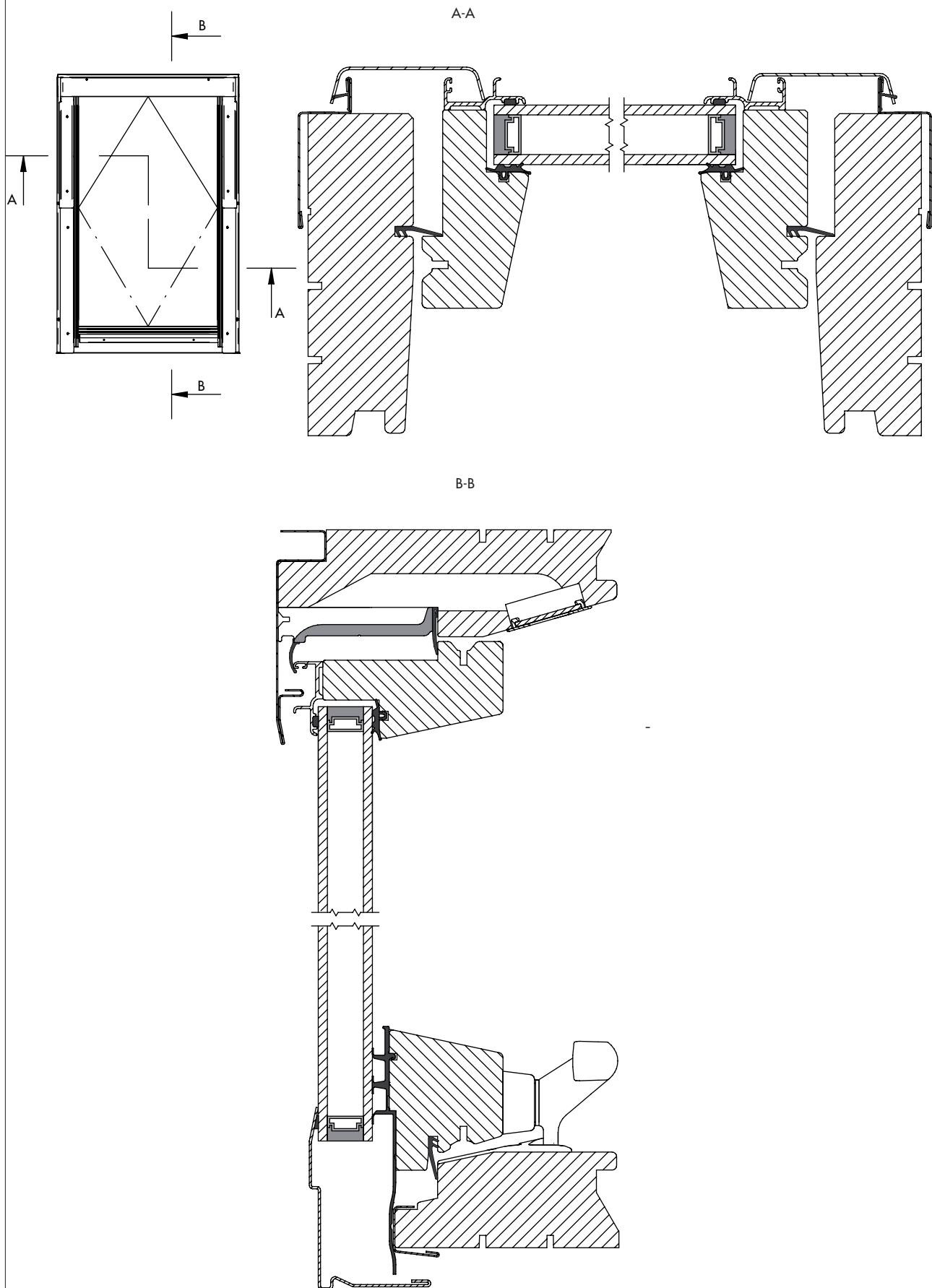




Figure 4 FTT U5 Centre Pivot Roof Window cross-sections

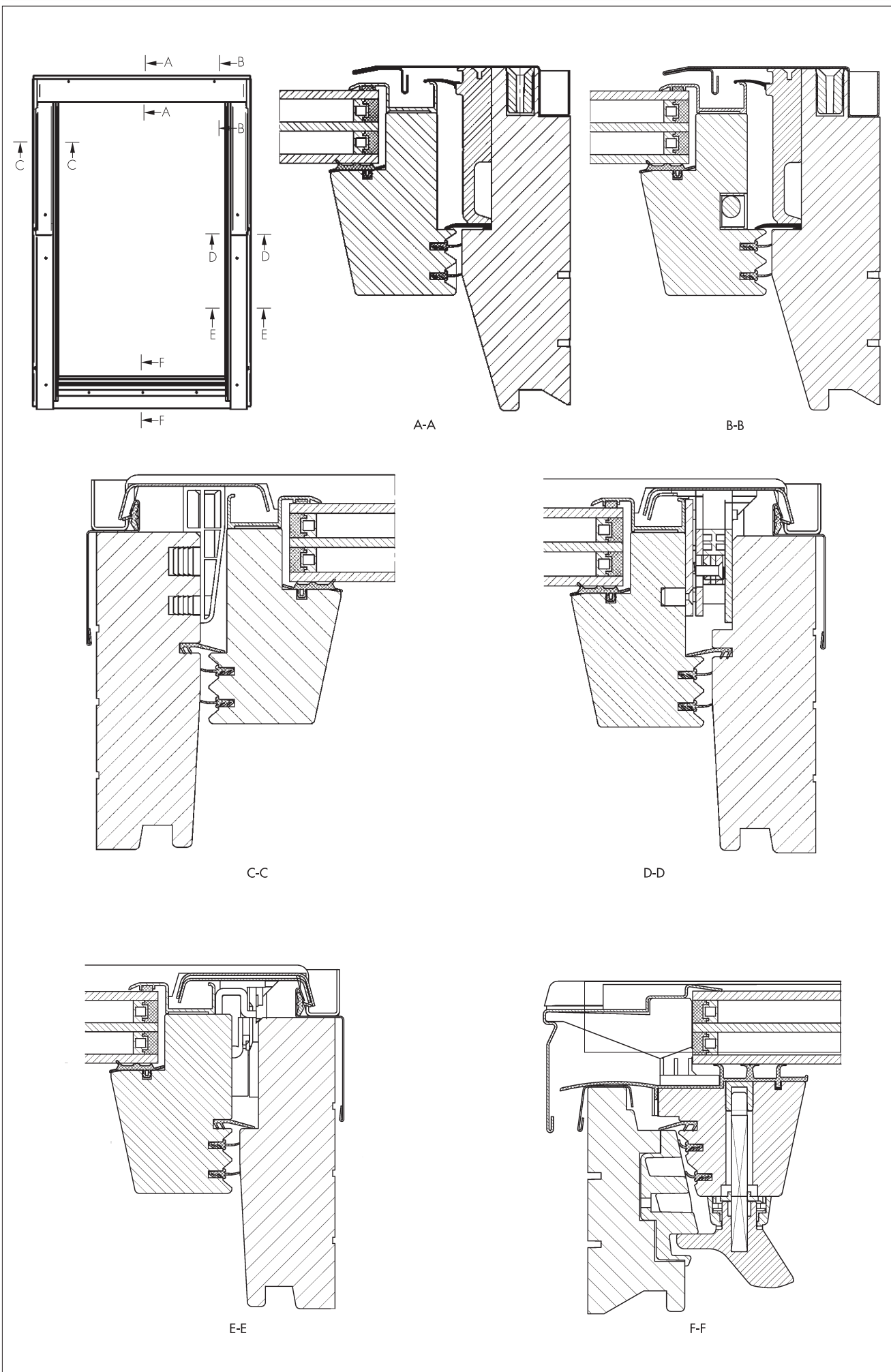




Figure 5 FTT U6 Centre Pivot Roof Window cross-sections

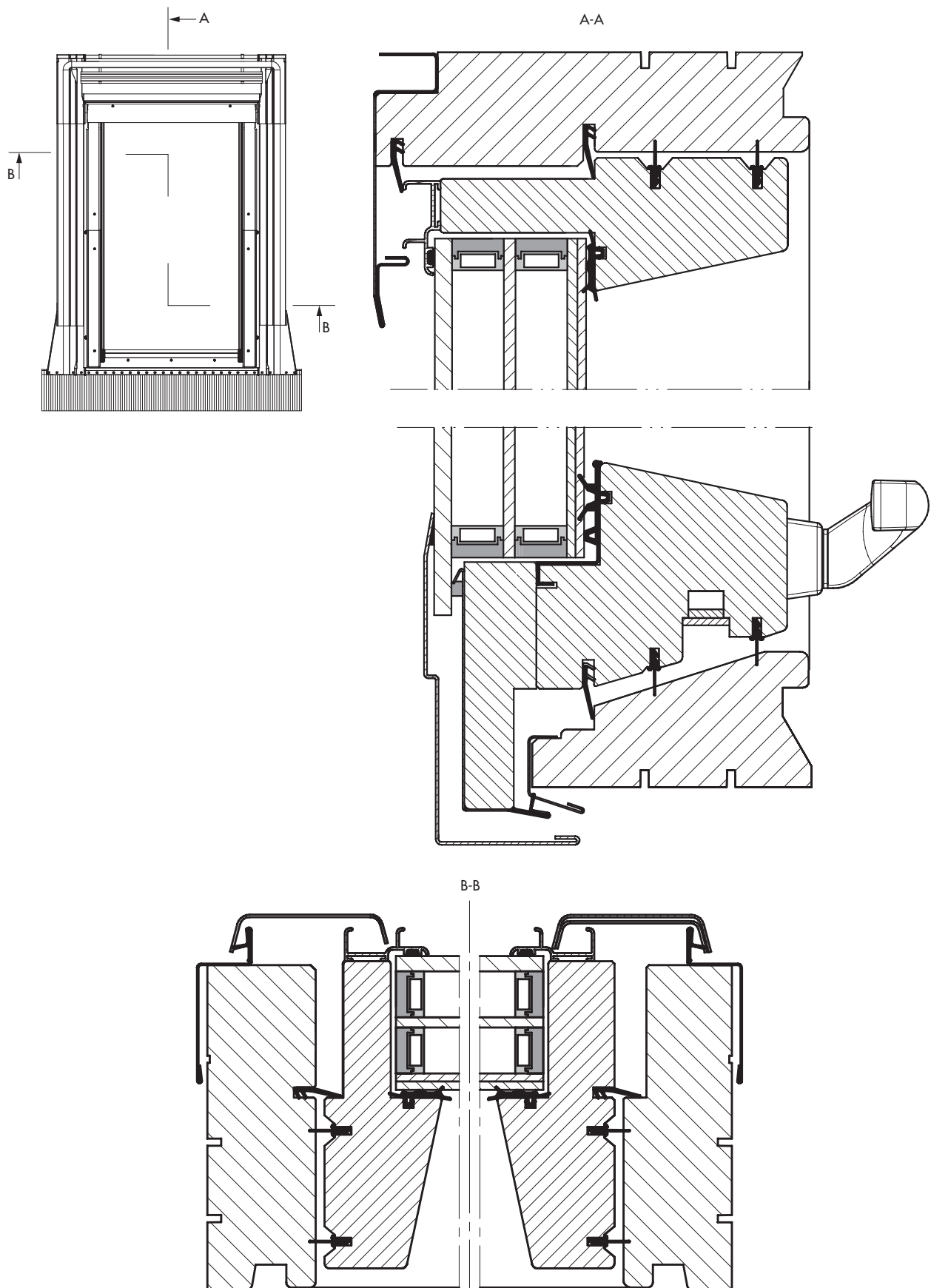
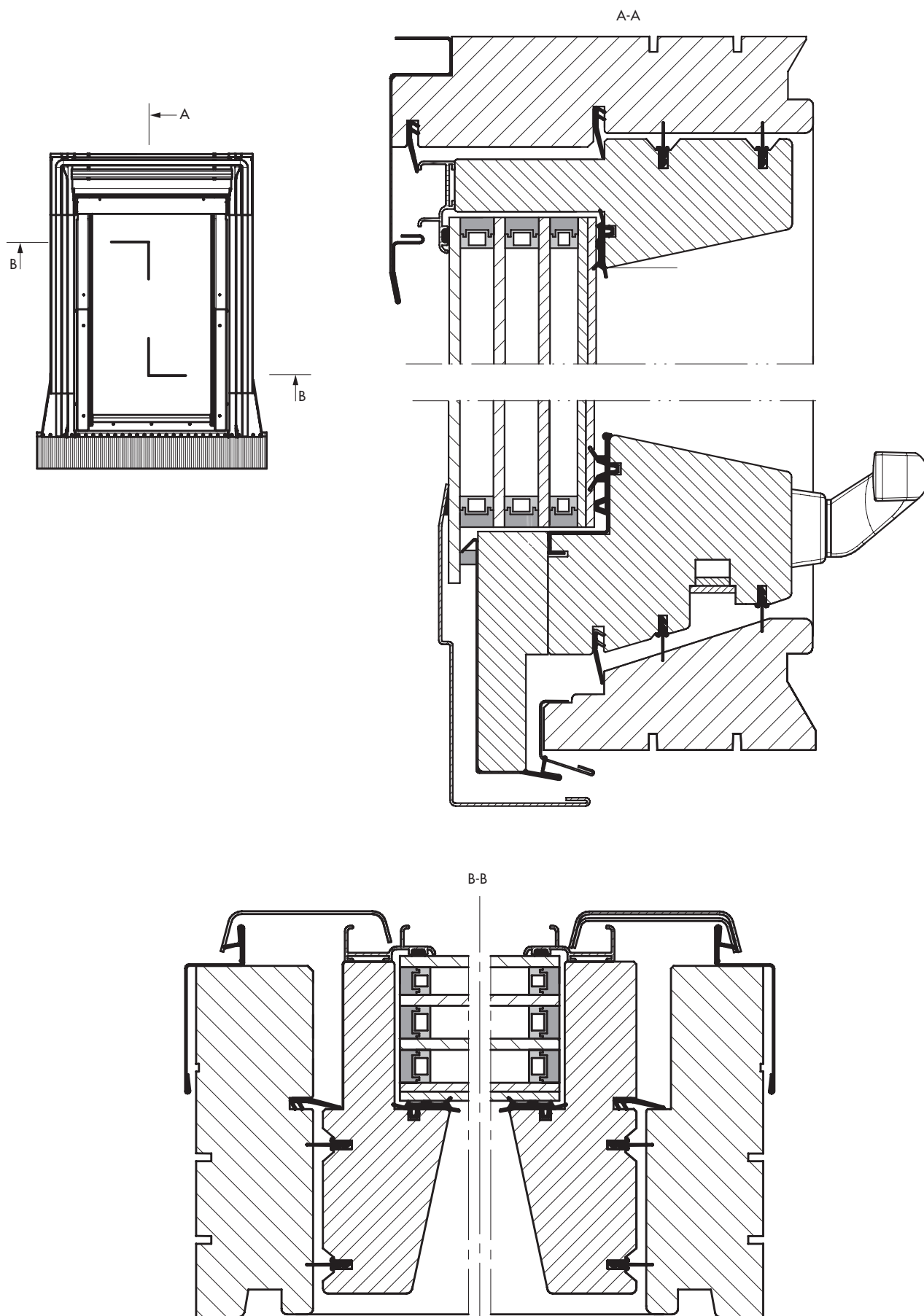


Figure 6 FTT U8 Centre Pivot Roof Window cross-sections



*Table 1 Size range*

Window code	Modular size width x height (mm)	Outer frame dimensions (mm)		Opening light dimensions (mm)			
				FTP-V U3, FTP-V/C U3, FTP-V L3, FTP-V/C L3, FTT U5, FTS-V U2		FTT U6, FTT U8	
				Width	Height	Width	Height
01	550 x 780	547	781	462	691	—	—
02	550 x 980	547	981	462	891	462	894.5
03	660 x 980	657	981	572	891	572	894.5
04	660 x 1180	657	1181	572	1091	572	1094.5
05	780 x 980	777	981	692	891	692	894.5
06	780 x 1180	777	1181	692	1091	692	1094.5
07	780 x 1400	777	1401	692	1311	692	1314.5
08	940 x 1180	937	1181	852	1091	852	1094.5
09	940 x 1400	937	1401	852	1311	852	1314.5
10	1140 x 1180	1137	1181	1052	1091	1052	1094.5
11	1140 x 1400	1137	1401	1052	1311	1052	1314.5
12	1340 x 980	1337	981	1252	891	1252	894.5

*Figure 7 Conservation Centre Pivot Roof Window*



1.5 Flashings are available from the Certificate holder, but are outside the scope of this Certificate.

1.6 The roof windows are factory-glazed using sealed double-, triple- or quadruple-glazed, argon- or krypton-filled units featuring low emissivity coatings of emissivity ( $\epsilon_n$ ) = 0.01 and 0.03 (declared value), with a combination of float, toughened or laminated glass (see Table 2 of this Certificate). Glazing units carry CE marking to show compliance with BS EN 1279-5 : 2005.

Table 2 Glazing units

Window type	Glazing unit	Glass unit specification <sup>(1)</sup>
FTP-V U3 FTP-V/C U3 FTP-V/D U3	U3	4H-Tg16Ar-4T 4 mm thick toughened glass/16 mm argon-filled cavity with warm TGI spacer/4 mm thick float glass with low-E coating
FTS-V U2	U2	4H-St16Ar-4T 4 mm toughened/16 mm argon-filled cavity with galvanized steel frame spacer/4 mm float glass with low-E coating
FTP-V L3 FTP-V/C L3 FNP/D L3	L3	4HS-Tg14Ar-6.38T 4 mm toughened glass with easy maintenance coating/14 mm argon-filled cavity with warm TGI spacer/6.76 mm laminated glass with low-E coating
FTT U5	U5	4HT-Tg10Kr-4H-Tg10Kr-4HT 4 mm toughened glass with low-E coating/10 mm krypton-filled cavity with warm TGI spacer/4 mm toughened glass/10 mm krypton-filled cavity with warm TGI spacer/4 mm toughened glass with low-E coating
FTT U6	U6	6H-Tg18Ar-4HT-Tg18Ar-6.76 6 mm toughened glass/18 mm argon-filled cavity with warm TGI spacer/4 mm toughened glass with low-E coating/18 mm argon-filled cavity with warm TGI spacer/6.76 mm laminated glass
FTT U8	U8 VSG	4H-Tg10Kr-4HT-Tg12Kr-4HT-Tg12Kr-6.76T 4 mm toughened glass/10 mm krypton-filled cavity with warm TGI spacer/4 mm toughened glass with low-E coating/12 mm krypton-filled cavity with warm TGI spacer/4 mm toughened glass with low-E coating/12 mm krypton-filled cavity with warm TGI spacer/6.76 mm laminated glass with low-E coating

(1) Outer pane/cavity/inner pane.

Where: H is toughened glass

Tg is "warm" TGI spacer

St is galvanized steel spacer

T is low-E coating

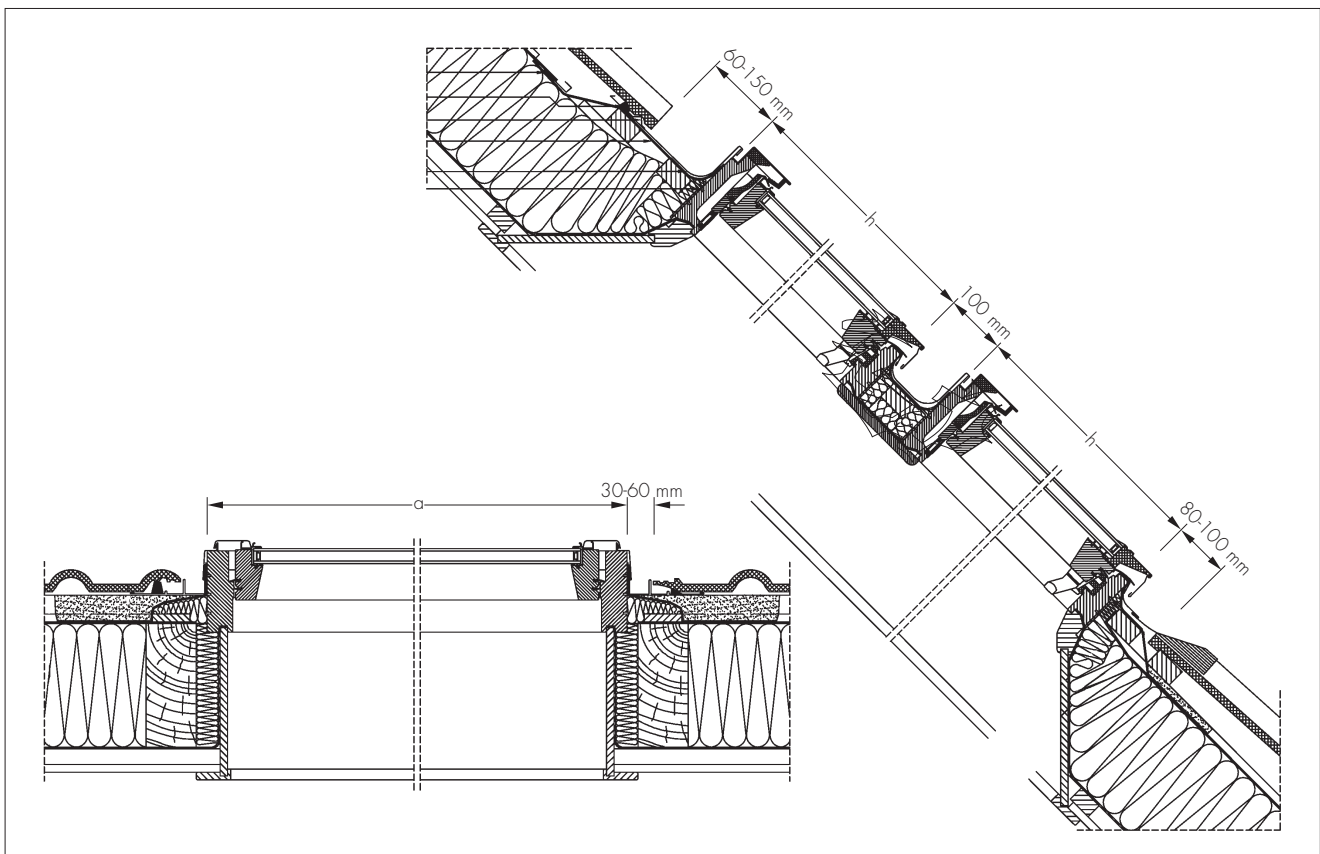
Ar is argon

Kr is krypton

S is easy maintenance coating (glazing finish outside the scope of this Certificate).

1.7 FTP-V/D U3 (opening) and FNP/D L3 (fixed) roof windows are designed for installation in vertical combinations. Windows are linked together using the vertical jointing module KD (see Figure 8).

Figure 8 FTP-V/D and FNP/D combination



1.8 The aluminium profiles protecting the outer frame and sash are extruded from aluminium sheet alloys type EN AW-1050 A to BS EN 573-3 : 2007 condition H44 to BS EN 515 : 1993. The aluminium sheet is 0.6 mm to 1.0 mm thick depending on component and meets the requirements of BS EN 485-1 : 2008. The covers are secured to the wood core with stainless steel screws.

1.9 The coil-coating on the aluminium components is available in RAL 7022 colour as standard (other colour finishes are an option) and, for conservation windows black and has a thickness of 20 µm to 25 µm.

1.10 Glazing units are sealed into the wooden sash using EPDM gaskets (BB200, top and sides, and bottom) conforming to DIN 7863 : 1983 on the inside and flexible butyl putty on the outside. The glazing unit is held with steel brackets. The profiles holding the glazing unit at the top and the jambs of the sash are made from aluminium alloy type EN AW-6060 to BS EN 573-3 : 2007 condition Thd T5 to BS EN 515 : 1993. The profiles holding the glazing unit at the bottom are extruded from aluminium sheet alloy EN AW-1050 A to BS EN 573-3 : 2007 condition H44 to BS EN 515 : 1993. The aluminium alloy profiles are coil-coated (minimum thickness 25 µm).

1.11 Opening lights are operated by either one or two handles positioned at the bottom member of the sash, constructed from anodized aluminium alloy with a polyester varnish. For cleaning and maintenance, the centre pivot hinges (which are constructed from zinc-coated galvanized steel) allow the sash to be turned through 180° and secured in position by engaging one or two bolts (depending on window size). A key-operated lock (or two depending on window size) is available and can be fitted at the bottom of the sash pivot.

1.12 EPDM weatherstripping is located in the grooves around the periphery of the opening light frame below the hinge axis and EPDM or TPE weatherstripping around the outer frame above the hinge axis. The weatherstripping above the hinge axis is fixed using special cover strips screwed to the frame. The weatherstripping below the hinge axis is fixed to the jambs of the opening light, using cover strips screwed to the jambs. The weatherstripping is pressed into the special groove in the bottom member of the opening light and secured using stainless steel staples.

1.13 FTP-V U3, FTP-V/C U3, FTP-V L3 and FTP-V/C L3 windows are equipped with V40P hit and miss vents and FTS-V U2 windows are equipped with V20 vent, fitted in the top member of the outer frame. Vents are made from aluminium alloy type EN AW-6101 to BS EN 573-3 : 2007. FTP-V/D U3 and FNP/D L3 windows are equipped with V10<sup>(1)</sup> vents. FTT Thermo windows do not incorporate vents.

(1) Outside the scope of this Certificate.

## 2 Manufacture

2.1 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.

2.2 The products are manufactured by Fakro Sp. z.o.o. and marketed in the UK by Fakro (GB) Ltd, Fakro House, Astron Business Park, Heathcote Road, Swadlincote, Derbyshire DE11 9DW.  
Tel: 01283 554755, Fax: 01283 224545, website: [www.fakro.co.uk](http://www.fakro.co.uk), e-mail: [sales@fakrogb.com](mailto:sales@fakrogb.com).

## 3 Delivery and site handling

3.1 The windows are delivered to site ready glazed. For transportation, they are protected in cardboard boxes to avoid damage.

3.2 Each window has a label bearing the company's logo, the CE marking as described in the *Additional information* section of this Certificate, product and manufacturing details for traceability and the BBA identification logo incorporating the number of this Certificate.

3.3 The windows should be stored under cover in a clean area, on edge and suitably supported to avoid distortion or damage.

3.4 The weight of the window is on the box. The weight of the window and its ease of handling, particularly by one person, must also be taken into account when planning site operations.

## 4 Environmental information

The timber used in the construction of the roof windows is FSC certified.

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Fakro FT Centre Pivot Roof Windows.

### 5 Use


5.1 The roof windows are suitable for use on roofs of domestic or non-domestic buildings with a pitch between 15° and 90° (between 15° and 70° for FTT U6 and FTT U8 Thermo roof windows), to provide natural light and ventilation. New roofs should be designed in accordance with the relevant national Building Regulations.

5.2 The windows are suitable for existing roofs and the replacement of existing roof windows. For such installations, it is important that the roof is checked for structural adequacy by a suitably-qualified and experienced individual, and strengthened as required to support the additional loads imposed upon it by the installation of the roof windows.

### 6 Practicability of installation

The products are designed to be installed by a competent general builder, or a contractor, experienced with these types of products.

### 7 Thermal insulation

 7.1 The thermal transmittance value (U value) of an FTT U8 roof window, 1230 mm wide by 1480 mm high, incorporating a central pivot opening light and glazed with a 4-10KrTg-4-12KrTg-4T-12KrTg-6.76 mm sealed, quadruple-glazed unit [all gas spaces must be bounded by glass with a low-E soft coating of emissivity ( $\epsilon_n$ ) = 0.01 (declared value), krypton-filled (90%) cavities and Technoform TGI spacers, when calculated in accordance with EN 10077-1 : 2007 and EN 10077-2 : 2005, is 0.58 W·m<sup>-2</sup>·K<sup>-1</sup>.

7.2 The thermal transmittance value (U value) of an FTT U6 roof window, 1230 mm wide by 1480 mm high, incorporating a central pivot opening light and glazed with a 6H-18ArTg-4HT-18ArTg-6.76T mm sealed, triple-glazed unit [all gas faces must be bounded by glass with a low-E soft coating of emissivity 4HT ( $\epsilon_n$ ) ≤ 0.03 (declared value)] and 6.76T ( $\epsilon_n$ ) ≤ 0.01 (declared value), argon-filled (90%) cavities and Technoform TGI spacers, when calculated in accordance with EN 10077-1 : 2007 and EN 10077-2 : 2005, is 0.80 W·m<sup>-2</sup>·K<sup>-1</sup>.

7.3 The thermal transmittance value (U value) of an FTP-V5 U3 roof window, 1097 mm wide by 1399 mm high, incorporating a centre pivot opening light and glazed with a 4H-16Ar TGI-4T mm sealed, double-glazed unit: inner pane [low-E soft coating of emissivity ( $\epsilon_n$ ) = 0.01 (declared value)], argon filled cavity and TGI spacers, when measured by the Guarded Hot Box Method according to BS EN ISO 12567-2 : 2005, is 1.3 W·m<sup>-2</sup>·K<sup>-1</sup>. In the opinion of the BBA, the thermal transmittance value (U value) of an FTP-V L3 roof window, incorporating a 6.76 mm laminated inner pane but otherwise identical, would be similar. In the opinion of the BBA, the thermal transmittance value (U value) of FTP-V/C and FTP-V L3 conservation roof windows, incorporating the same glazing units, would be similar.


7.4 The thermal transmittance value (U value) of an FTS-V roof window, 1136 mm wide by 1400 mm high, incorporating a central pivot opening light and glazed with a 4-16Ar and EWS galvanized steel spacers-4 mm sealed, double-glazed unit: Silverstar ENplus (Euroglas) as the inner pane [low-E soft coating of emissivity ( $\epsilon_n$ ) = 0.03 (declared value)], argon-filled cavity and EWS spacers, when measured by the Guarded Hot Box Method according to BS EN ISO 12567-2 : 2005, is 1.4 W·m<sup>-2</sup>·K<sup>-1</sup>.

7.5 For the purposes of heat loss calculations, the U values measured in sections 7.1 to 7.4 should be adjusted according to the installed slope of the roof window in accordance with Section 11.1 of BRE Report BR 443 : 2006.

7.6 The overall thermal insulation of the windows will be dependent on the performance of the double-glazed units. For glazing units other than those described above, the indicative U values shown in Table 6e of SAP 2009 *The Government's Standard Assessment Procedure for Energy Rating of Dwellings* can be used. When available, a certified U value by measurement to BS EN ISO 12567-2 : 2005, or calculation to BS EN ISO 10077-1 : 2006 and BS EN ISO 10077-2 : 2012 should be used in preference.

7.7 Design U values are detailed in the documents supporting the national Building Regulations.

### 8 Weathertightness

 8.1 When installed in accordance with the manufacturer's instructions and sections 19 and 20 of this Certificate, the windows will adequately resist weather ingress.

8.2 The windows were tested to BS EN 14351-1 : 2006 and are suitable for use as indicated in Table 3 of this Certificate. The classifications are based on the assumption that the outer frame is secured and installed in accordance with the manufacturer's instructions.

**Table 3 Weathertightness classifications**

	Classification to		
	BS EN 12207 : 2000	BS EN 12208 : 2000	BS EN 12210 : 2000
<i>FTP-V U3, FTP-V L3, FTT U5</i>			
Air permeability <sup>(1)</sup>	Class 4		
Watertightness <sup>(1)</sup>		Class E1200	
Wind resistance <sup>(1)</sup>			Class 5C
<i>FTS-V U2</i>			
Air permeability <sup>(1)</sup>	Class 4		
Watertightness <sup>(1)</sup>		Class E1200	
Wind resistance <sup>(1)</sup>			Class 5C
<i>FTT U6 Thermo, FTT U8</i>			
Air permeability <sup>(1)</sup>	Class 4		
Watertightness <sup>(1)</sup>		Class E1050	
Wind resistance <sup>(1)</sup>			Class 5C

(1) Window tested in the vertical position.

8.3 For unusual building layouts, building shapes or ground topography, the designer will need to give particular consideration to the prevailing exposure conditions.

## 9 Structural stability



9.1 The products can be selected to have adequate resistance to wind loads calculated in accordance with BS EN 1991-1-4 : 2005 and its National Annex.

9.2 The amount of the actual snow load imposed will depend upon a number of factors, such as height above sea level, geographical location and roof arrangement. Therefore, it is recommended that BS EN 1991-1-3 : 2003 and its National Annex is used to calculate the actual snow load to be anticipated for a specific installation.

9.3 Details of connections between the roof window and the roof must be determined by a suitably-qualified and experienced individual. Guidance is available in the installation instructions and from the Certificate holder.

## 10 Ventilation



10.1 The approximate opening area for rapid natural ventilation is given in Table 4 of this Certificate.

**Table 4 Ventilation areas**

Window code	Opening area for rapid natural ventilation (m <sup>2</sup> )	Equivalent area for trickle ventilation <sup>(1)</sup> (mm <sup>2</sup> )	
		Vent V20	Vent V40P
01	0.27	1274	1274
02	0.35	1274	1274
03	0.44	1820	1820
04	0.55	1820	1820
05	0.44	2366	2548
06	0.67	2366	2548
07	0.82	2366	2548
08	0.84	2366	2730
09	1.02	2366	2730
10	1.04	3640	3640
11	1.27	3640	3640
12	1.000	3640	3640

(1) Based on an equivalent area of 182 mm<sup>2</sup> per vent's aperture.

10.2 Contribution to the background ventilation requirements of the various Building Regulations can be made by the adjustable air vents incorporated in the roof windows, where fitted (see Figure 7).

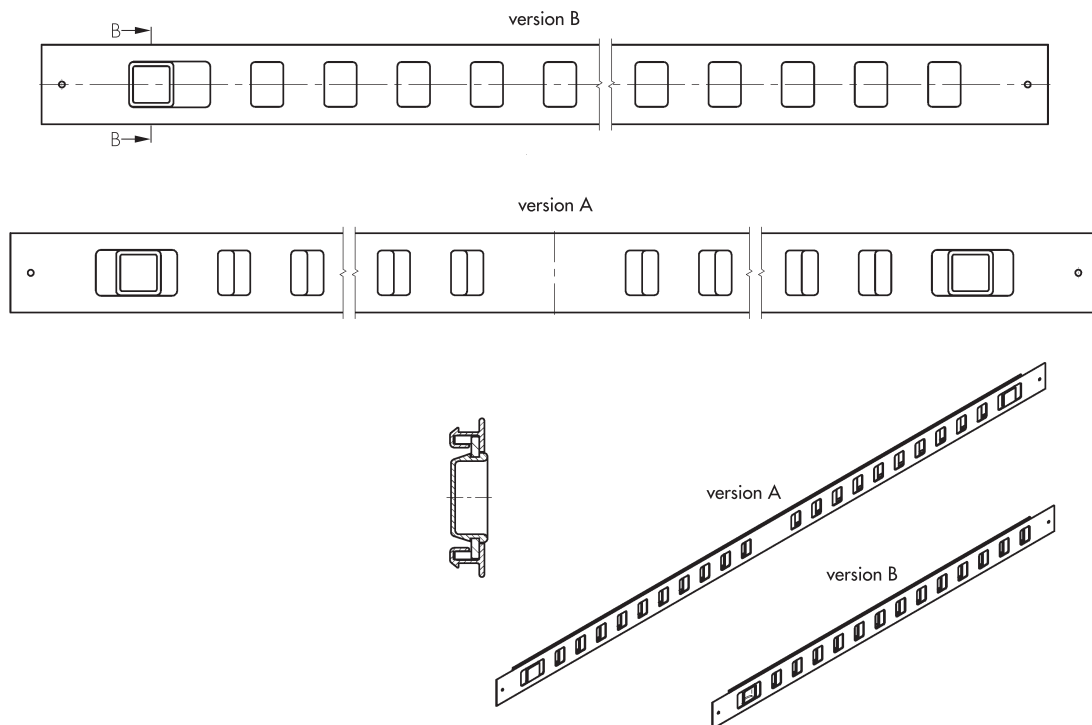




10.3 The equivalent area of the vents (see Figure 7) is given in Table 4 of this Certificate.

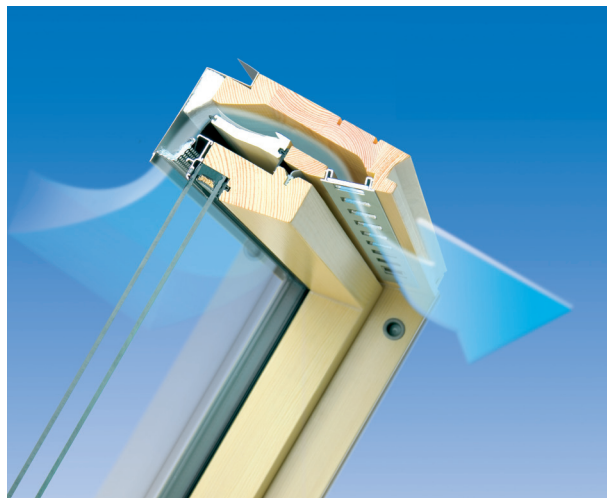
10.4 The vents' geometric area will be greater than the equivalent areas in Table 4 of this Certificate; however, the integral mesh makes a determination impractical. Users in Scotland should, therefore, take the relevant equivalent area in Table 4 of this Certificate when considering requirements for minimum geometric area.

Figure 9 Vents



width of the window (mm)	550	660	780	940	1140	1340
version	B			A		
L (mm)	364	474	594	594	954	954
number of apertures	7	10	13	13	20	20

vent V20



vent V4OP

## 11 Behaviour in relation to fire



11.1 The glazing used in the windows is Class A1 by reference to the European Commission Decision 96/603/EC and can therefore be considered as non-combustible.



11.2 When used in roof windows, unwired glass at least 4 mm thick can be regarded as having an AA designation.



11.3 When used in roof windows, glass at least 4 mm thick is classified as 'low vulnerability' material.



11.4 Where a window is required in a dwelling to provide a means of escape from an inner room or a loft space converted into a habitable room, the window can meet the relevant requirements of the national Building Regulations when it:

- is in a room with a floor not more than 4.5 m above ground level
- positioned so that the bottom of the opening is no more than 1.1 m above the floor
- provides a clear opening area of at least 0.33 m<sup>2</sup> and not less than 450 mm high by 450 mm wide, which may be at an angle or straight through. The obstruction caused by opening lights hung on pivot hinges must be taken into account when the clear opening is determined. In addition:

**England and Wales** — windows must remain open without needing to be held

**Scotland** — locks may be used but must not cause a permanent obstruction to satisfy clause 2.9.4<sup>(1)</sup> as escape windows  
(1) Technical Booklet (Domestic).

**Northern Ireland** — the window must be positioned not less than 600 mm above the floor.

11.5 It is recommended that windows must remain open without needing to be held, where this is not a regulatory requirement.

## 12 Glass area



The approximate visible glass area of the windows is given in Table 5 of this Certificate.

Table 5 Approximate visible glass area

Window code	Visible glass area (m <sup>2</sup> )
01	0.21
02	0.29
03	0.38
04	0.47
05	0.47
06	0.59
07	0.73
08	0.75
09	0.92
10	0.95
11	1.16
12	0.92

## 13 Condensation risk



Experience of products similar to Fakro FT Centre Pivot Roof Windows has shown that, in normal domestic or similar applications, roof windows do not constitute a significant condensation risk when correctly installed.

Guidance on design details is given in *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings*, TSO, 2002. Further information is contained in BRE Report BR 262 : 2002. Also see section 9 of this Certificate.

## 14 Safety



14.1 The external pane of opening glazing units can be cleaned from inside the building.



14.2 The windows can comply with the recommendations of BS 8213-1 : 2004 with regard to the positioning of hand-operated controls.



14.3 Account must be taken of the recommendations given in BS 6262-4 : 2005 which, in certain circumstances, include the use of safety glass complying with BS EN 12600 : 2002. Windows installed with safety glazing complying with BS EN 12600 : 2002 must be installed where accidental collision is likely.

14.4 When selecting means of access during the period of installation, for example use of scaffolding, the safety of the operatives, occupants and passers-by should be considered.

## 15 Security against intrusion

15.1 The opening lights are fitted with a lock mechanism as described in section 1.10 of this Certificate. When fastened in the closed position the opening light cannot be opened by manipulation from the outside, for example, by the insertion of a thin blade. The opening lights can be fitted with a key-operated locking device, where the windows are required to satisfy the security requirements of *NHBC Standards 2014, Chapter 6.7 Doors, windows and glazing*. It is the responsibility of the building designer to specify where these requirements need to be satisfied.

15.2 The arrangement of the aluminium cladding and glazing retaining profiles with screw fixings ensures that removal of the glass is difficult from the outside.

## 16 Ease of operation

The windows can be operated without difficulty when correctly installed.

## 17 Maintenance

17.1 The external glazing and external frame members can be cleaned using water containing household detergent. If dirt is allowed to build up on the members over long periods, it may become more difficult to restore the surface appearance.



17.2 The windows can be re-glazed and the gaskets and weatherstripping replaced, but these operations are outside the scope of this Certificate.

17.3 Maintenance painting of the internal finishes should be considered if a high aesthetic standard is required (see sections 18.2 and 18.4 of this Certificate). The Certificate holder can recommend a suitable paint and maintenance system but this is outside the scope of this Certificate.



17.4 If damage occurs, the furniture and fittings can be replaced.

17.5 The pivot hinges and locking mechanism should be lubricated periodically to minimise wear and to ensure smooth operation.

17.6 Care should be taken when using proprietary materials for cleaning the glass, to ensure that deposits are not allowed to remain on the wood or aluminium surfaces where they may cause discoloration and damage to the surface. In addition, care must be taken to avoid damage to, or discoloration of, the members when stripping paint from adjacent timber, for example, by means of a blowlamp or paint stripper.

## 18 Durability



18.1 The external faces of the frames and sashes are protected by aluminium covers. Therefore, the life of the roof windows is expected to be at least equal to conventional timber windows.

18.2 The performance of the external coating will depend on its environment, location and aspect face. It will retain a good appearance for at least 15 years.

18.3 Any external colour change or surface dulling of the aluminium covers that might occur will be uniform over any one elevation.



18.4 The appearance of the acrylic internal finish may be reduced in areas of high humidity such as kitchens or bathrooms, or if subjected to mechanical damage. The appearance can be restored by overcoating, but this is outside the scope of this Certificate.

18.5 The fittings described in this Certificate (including pivot hinges and locking handles) will have similar durability except where windows are to be installed in areas subject to particularly aggressive conditions such as coastal locations or near sources of industrial pollutants. In such areas, replacement of fittings may be necessary within the life of the window.

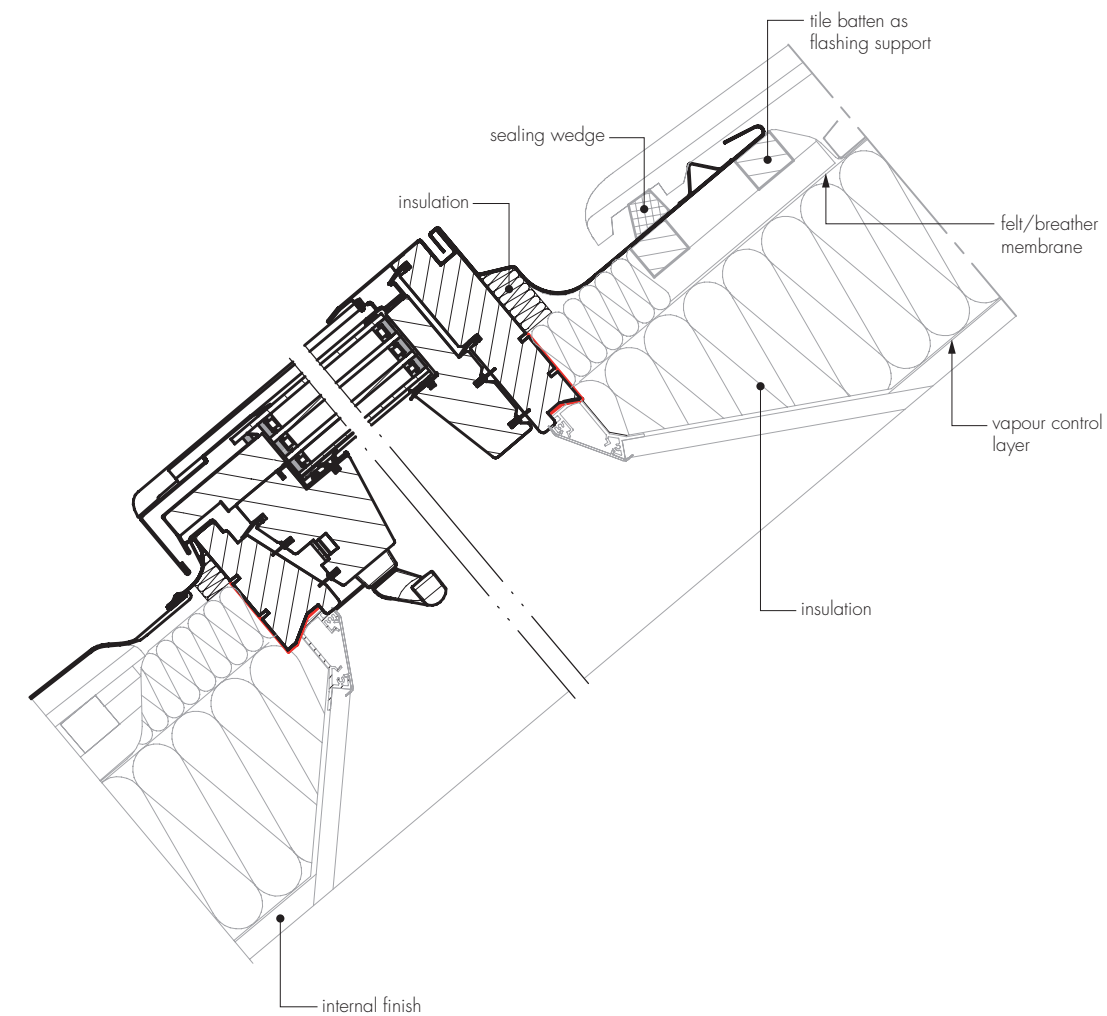
18.6 The gaskets and weatherstripping may need to be replaced within the life of the window.

## Installation

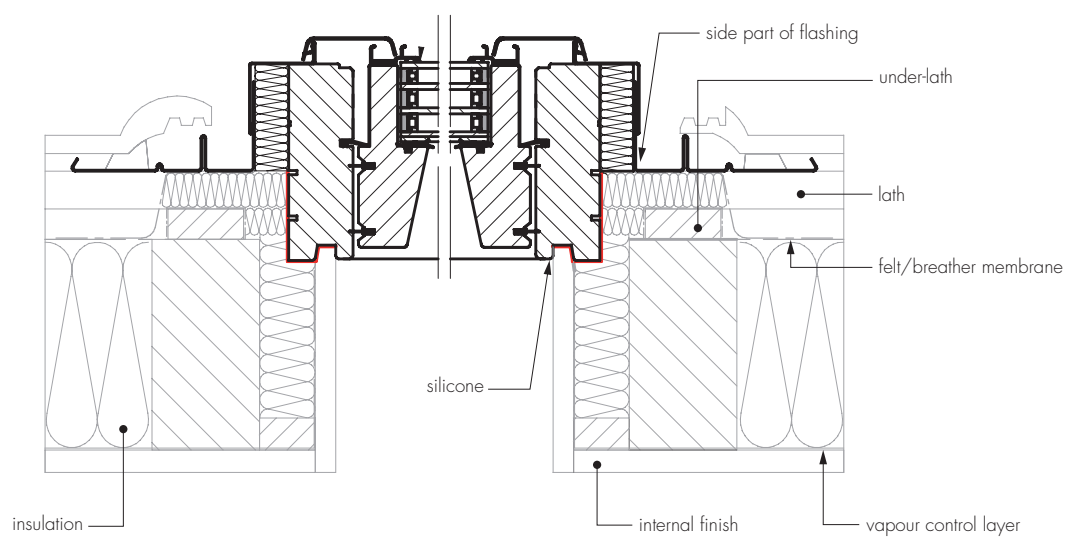
## 19 General

19.1 Fakro FT Centre Pivot Roof Windows must be fixed into the opening, in accordance with the recommendations in the *Fakro Instructions for Fitting Roof Window to Rafters*, using angled anchors, made from zinc-coated, galvanized steel, fixed to the window frame and rafters or battens. The window may be installed at any point above floor level (subject to Building Regulations approval), but consideration must be given to ease of operation. See Figure 10 for typical installations.

Figure 10 Typical window placements



sill detail



jamb detail

19.2 With suitable propping, it is normally acceptable to cut out one rafter and form a trimmed opening. Where more extensive cutting of structural members is proposed, or in any case of doubt, a suitably-qualified and experienced individual should be consulted.

19.3 When preparing the opening to accept the roof window, a tolerance of 10 mm to 50 mm should be allowed.

19.4 The positioning of the window depends on the type of roofing material. In the case of tiles or slates, the window must be installed above a complete row of tiles or slates, as these must not be cut under the window. In the case of metal roof sheets or similar, the window must be installed above a horizontal lap. In the case of corrugated roof sheets or high profile tiles or slates, it is recommended that the upper edge of the roofing material is cut (tiles or slates) or flattened (metal roof sheets or similar) under the edge of the window.

19.5 When installing the window, the distances between the edge of the window and roofing material shown in Table 6 must be maintained:

<i>Table 6 Installation details</i>	
Distance from edge of window (mm)	Distance from roofing material (mm)
Bottom edge	0 to 40 mm for flat tiles (up to 5 mm thick, eg slates) 20 to 100 mm for tiles (over 5 mm and up to 15 mm thick) 80 to 100 mm for tiles up to 45 mm thick 90 to 120 mm for tiles/corrugated sheets up to 90 mm thick
Side edge	30 to 60 mm
Top edge	60 to 150 mm

19.6 The window aperture should be marked on the roofing felt. When cutting away the roofing material a 100 mm flap should be allowed all around to provide a waterproof damp-proof membrane (dpm). The battens are cut out where the window is to be fitted. A roof gutter is installed above the position of the window after cutting out a section of counter batten, if installed, and cutting the felt diagonally.

19.7 Depending on the size of the window, four or six angle brackets (for windows over 1400 mm high) are used. The optimum width spacing between the rafters should be close to the width of the window and can be 20 mm to 50 mm larger than it. In the case of a roof having a different spacing between the rafters, or if the roof is constructed on bidding rafters, additional timber bridging support must be provided.

19.8 The battens or roof boarding is cut where the window is to be fitted, to the width of the window plus 20 mm to 50 mm and to the height of the window plus 20 mm to 40 mm.

## 20 Procedure

### Preparation of the window

20.1 The opening light frame and the side mounting supports are removed and the lower support is unscrewed from the casing in accordance with the manufacturer's instructions.

20.2 The supplied angle mounting brackets are fixed to the jambs of the outer frame approximately 100 mm from the corners in accordance with the manufacturer's instructions.

### Mounting the window on the roof

20.3 The casing is fitted into the prepared opening in the roof ensuring that it lies horizontally using a spirit level.

20.4 The lower angle brackets are screwed onto the rafters or battens and the opening light frame is fitted into the casing in accordance with the manufacturer's instructions and the top angle brackets are screwed onto the rafters.

20.5 Insulation should be provided between the window frame and the roof structure before fitting and securing the roof tile underlay around the perimeter of the roof window. A vapour control layer is then mounted on the interior side of the installation.

20.6 Installation is completed by fixing the appropriate covers and flashings in accordance with the manufacturer's instructions.

## Technical Investigations

## 21 Tests

21.1 Tests were carried out to determine:

- air permeability
- watertightness
- effect of wind loads
- effect of thermal differential
- efficiency of window fittings
- mechanical loading tests

- load bearing capacity of safety devices
- ease of operation
- basic security test.

21.2 The coil-coating on the aluminium covers was tested to determine:

- resistance to sulfur dioxide
- resistance to artificial weathering
- adhesion to substrate
- resistance to cracking and bending
- resistance to scratching.

21.3 Independent test data were examined relating to:

- air permeability
- watertightness
- effect of wind loads
- thermal transmittance.

21.4 Air vents, type V20 and V40P, were tested in accordance with BS EN 13141-1 : 2004.

## 22 Investigations

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

## Bibliography

BS 6262-4 : 2005 *Glazing for buildings — Code of practice for safety related to human impact*

BS 8213-1 : 2004 *Windows, doors and rooflights — Design for safety in use and during cleaning of windows, including door-height windows and roof windows — Code of practice*

BS EN 485-1 : 2008 *Aluminium and aluminium alloys — Sheet, strip and plate — Technical conditions for inspection and delivery*

BS EN 515 : 1993 *Aluminium and aluminium alloys — Wrought products — Temper designations*

BS EN 573-3 : 2007 *Aluminium and aluminium alloys — Chemical composition and form of wrought products — Chemical composition and form of products*

BS EN 1279-5 : 2005 *Glass in building — Insulating glass units — Evaluation of conformity*

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

NA to BS EN 1991-1-3 : 2003 UK National Annex to *Eurocode 1 : Actions on structures — General actions — Snow loads*

BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*

NA to BS EN 1991-1-4 : 2005 UK National Annex to *Eurocode 1 : Actions on structures — General actions — Wind actions*

BS EN 12207 : 2000 *Windows and doors — Air permeability — Classification*

BS EN 12208 : 2000 *Windows and doors — Watertightness — Classification*

BS EN 12210 : 2000 *Windows and doors — Resistance to wind load — Classification*

BS EN 12600 : 2002 *Glass in building — Pendulum test — Impact test method and classification for flat glass*

BS EN 13141-1 : 2004 *Ventilation for buildings — Performance testing of components/products for residential ventilation — Externally and internally mounted air transfer devices*

BS EN 14351-1 : 2006 *Windows and doors — Product standard, performance characteristics — Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics*

BS EN ISO 10077-1 : 2006 *Thermal performance of windows, doors and shutters — Calculation of thermal transmittance — Simplified method*

BS EN ISO 10077-2 : 2012 *Thermal performance of windows, doors and shutters — Calculation of thermal transmittance — Numerical method for frames*

BS EN ISO 12567-2 : 2005 *Thermal performance of windows and doors — Determination of thermal transmittance by hot box method — Roof windows and other projecting windows*

BRE Report (BR 262 : 2002) *Thermal insulation : avoiding risks*

BRE Report (BR 443 : 2006) *Conventions for U-value calculations*

Commission Decision 96/603/EC of 4 October 1996 establishing the list of products belonging to Classes A 'No contribution to fire' provided for in Decision 94/611/EC implementing Article 20 of Council Directive 89/106/EEC on construction Products

DIN 7863 : 1983 *Non cellular elastomer glazing and panel gaskets; technical delivery conditions*

EN 10077-1 : 2007 *Thermal performance of windows, doors and shutters — Calculation of thermal transmittance — Simplified method*

EN 10077-2 : 2005 *Thermal performance of windows, doors and shutters — Calculation of thermal transmittance — Numerical method for frames*

## Conditions of Certification

### 23 Conditions

23.1 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.

23.2 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.

23.3 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.

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

23.5 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.

23.6 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.