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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
08/4608
Product Sheet 1

VELUX ROOF WINDOWS

VELUX CENTRE PIVOT ROOF WINDOWS

This Agrément Certificate Product Sheet(1) relates to VELUX Centre Pivot Roof Windows for use on roofs of domestic and commercial 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 1.0 and 1.4 $W \cdot m^{-2} \cdot K^{-1}$, depending on the glazing unit (see section 6).

Weathertightness — the windows can be used in the exposure situations described in this Certificate (see section 7).

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 8).

Ventilation — the windows can provide rapid ventilation and background ventilation (see section 9).

Behaviour in relation to fire — the glazing used in the windows can be considered as non-combustible material (see section 10).

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 internal finish will maintain an acceptable appearance for up to 10 years (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: 29 October 2013

Originally certificated on 27 February 2009

John Albon — Head of Approvals
Energy and Ventilation

Claire Curtis-Thomas
Chief Executive

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers 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, VELUX Centre Pivot Roof Windows, if installed, used and maintained in accordance with this Certificate, will satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):

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

Requirement:	**A1**	**Loading**
Comment:		The products will have sufficient strength and stiffness to sustain the imposed load. See sections 8.1 and 8.2 of this Certificate.
Requirement:	**B2**	**Internal fire spread (linings)**
Comment:		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 10.1 of this Certificate.
Requirement:	**B4(2)**	**External fire spread**
Comment:		When used in roof windows, unwired glass at least 4 mm thick can be regarded as having an AA designation. See section 10.2 of this Certificate.
Requirement:	**C2(b)**	**Resistance to moisture**
Comment:		The windows will resist weather ingress. See sections 7.1 and 7.2 of this Certificate.
Requirement:	**C2(c)**	**Resistance to moisture**
Comment:		The windows can contribute to satisfying this Requirement. Vents will provide airflow to alleviate surface condensation. See sections 9.1 to 9.3 and 12 of this Certificate.
Requirement:	**F1(1)**	**Means of ventilation**
Comment:		In assessing the contribution of the products to natural purge ventilation, the area of opening given in section 9.1 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. See sections 9.2 and 9.3 of this Certificate.
Requirement:	**L1(a)(i)**	**Conservation of fuel and power**
Comment:		In calculating the heat loss through windows, the U values given in section 6 of this Certificate should be used.
Requirement:	**N1**	**Protection against impact**
Comment:		Glazing less than 800 mm above floor level should meet the requirements of N1 or should comply with the requirements of BS EN 12600 : 2002. See section 13.2 of this Certificate.
Requirement:	**N3**	**Safe opening and closing of windows, skylights and ventilators**
Comment:		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 13.1 of this Certificate.
Requirement:	**N4**	**Safe access for cleaning windows etc**
Comment:		In buildings other than dwellings, this Requirement can be met. See section 17.1 of this Certificate.
Regulation:	**7**	**Materials and workmanship**
Comment:		The products are acceptable. See sections 18.1, 18.2 and 18.4 to 18.7 and the *Installation* part of this Certificate.
Regulation:	**26**	**CO_2 emission rates for new buildings**
Comment:		The products contribute to satisfying this Regulation. See section 6 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Durability, workmanship and fitness of materials**
Comment:		The products satisfy the requirements of this Regulation. See sections 17.3, 17.5, 17.6, 18.1, 18.2 and 18.4 to 18.7 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	1.1(b)	Structure
Comment:		The products will have sufficient strength and stiffness to sustain the imposed loads, with reference to clause 1.1.1[(1)(2)], 1.1.2[(1)(2)] and 1.1.3[(1)(2)]. See sections 8.1 and 8.2 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[(1)(2)]. See section 10.1 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[(1)(2)]. See section 10.3 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The products will resist weather ingress, with reference to clause 3.10.1[(1)(2)]. See sections 7.1 and 7.2 of this Certificate.
Standard:	3.14	Ventilation
Comment:		In calculating the contribution of the windows to natural ventilation, with reference to clause 3.14.1[(1)(2)] to this Standard, see section 9.1 of this Certificate. Trickle ventilation, with reference to clauses 3.14.3[(2)] and 3.14.5[(1)], is provided by vents incorporated in the windows. See section 9.2 of this Certificate.

Standard:	3.15	Condensation
Comment:		The windows can contribute to satisfying this Standard with reference to clauses 3.15.1[1][2], 3.15.2[1][2] and 3.15.4[1][2]. See section 12 of this Certificate. Vents will provide airflow to alleviate surface condensation with reference to clause 3.15.4[1][2]. See sections 9.1, 9.2 and 12 of this Certificate.
Standard:	3.16	Natural lighting
Comment:		In calculating the contribution of the windows to natural lighting, with reference to clauses 3.16.1[1] and 3.16.3[1] to this Standard, see section 11 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[1][2]. See section 13.2 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[1][2]. See section 17.1 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		In calculating the heat loss through windows, the U values given in section 6 of this Certificate should be used.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The products can contribute to meeting 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[1][2] [Aspects 1[1][2] and 2[1]], 7.1.6[1][2] [Aspects 1[1][2] and 2[1]] and 7.1.7[1][2] [Aspect 1[1][2]]. See section 6 of this Certificate.
Regulation:	12	Building standards applicable to conversions
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[1][2] and Schedule 6[1][2].

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012

Regulation:	23	Fitness of materials and workmanship
Comment:		The products are acceptable. See sections 17.3, 17.5, 17.6, 18.1, 18.2 and 18.4 to 18.7 and the *Installation* part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The products will not adversely affect the resistance of the roof to the passage of moisture. See sections 7.1 and 7.2 of this Certificate.
Regulation:	30	Stability
Comment:		The products will have sufficient strength and stiffness to sustain the imposed load. See sections 8.1 and 8.2 of this Certificate.
Regulation:	34	Internal fire spread — Linings
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 10.1 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		When used in roof windows, unwired glass at least 4 mm thick can be regarded as having an AA designation. See section 10.2 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide emission rate
Comment:		In calculating the heat loss through windows, the U values given in section 6 of this Certificate should be used.
Regulation:	65(1)	Means of ventilation
Comment:		When calculating the area of window openings for ventilation purposes, see section 9.1 of this Certificate. Trickle ventilation is provided by the vents incorporated in the windows. See sections 9.2 and 9.3 of this Certificate.
Regulation:	96	Impact with glazing
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 13.2 of this Certificate.
Regulation:	98	Safe opening and closing of windows, skylights and ventilators
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 13.1 of this Certificate.
Regulation:	99	Safe means of access for cleaning glazing
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 17.1 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 section: 3 *Delivery and site handling* (3.4 and 3.5) of this Certificate.

The Electrical Equipment (Safety) Regulations 1994 and the Electromagnetic Compatibility Regulations 2005

These Regulations implement the *Low Voltage Directive* 2006/95/EC and the *Electromagnetic Compatibility Directive* 2004/108/EC and require manufacturers to carry out assessment of their products against the criteria given in the Directives. Declarations of Conformity have been provided by the Certificate holder. The BBA has not assessed these products for compliance with these Directives.

Additional information

NHBC Standards 2013

NHBC accepts the use of the VELUX Centre Pivot Roof Windows, when installed and used 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 VELUX GGL Centre Pivot Roof Windows (see Figures 1, 2 and 3) are fabricated from preserved multi-laminated softwood frames and sashes featuring coil-coated aluminium on the external faces and clear satin water-based lacquer or white satin water-based acrylic paint on the internal faces of the frames and sashes. Members of the outer frames and sashes are glued and nailed at the corners.

1.2 VELUX GGU Centre Pivot Roof Windows (see Figures 1, 2 and 3) are fabricated from a timber core surrounded by moulded polyurethane frames and sashes featuring coil-coated aluminium covers on the external faces and white polyurethane lacquer on the internal faces of the frames and sashes. Members of the outer frames and sashes are glued and nailed at the corners.

Figure 1 VELUX Centre Pivot Roof Window cross sections

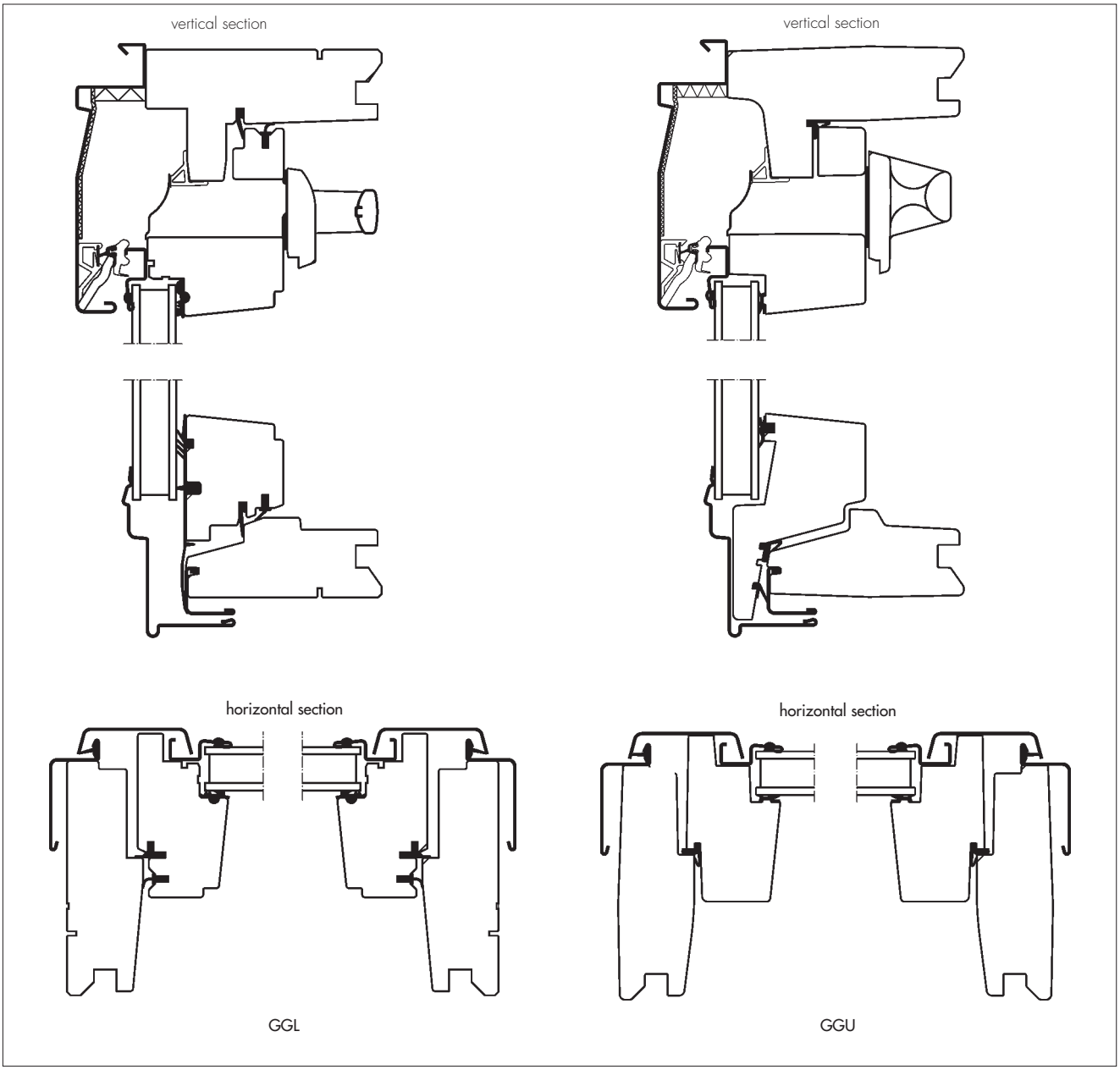
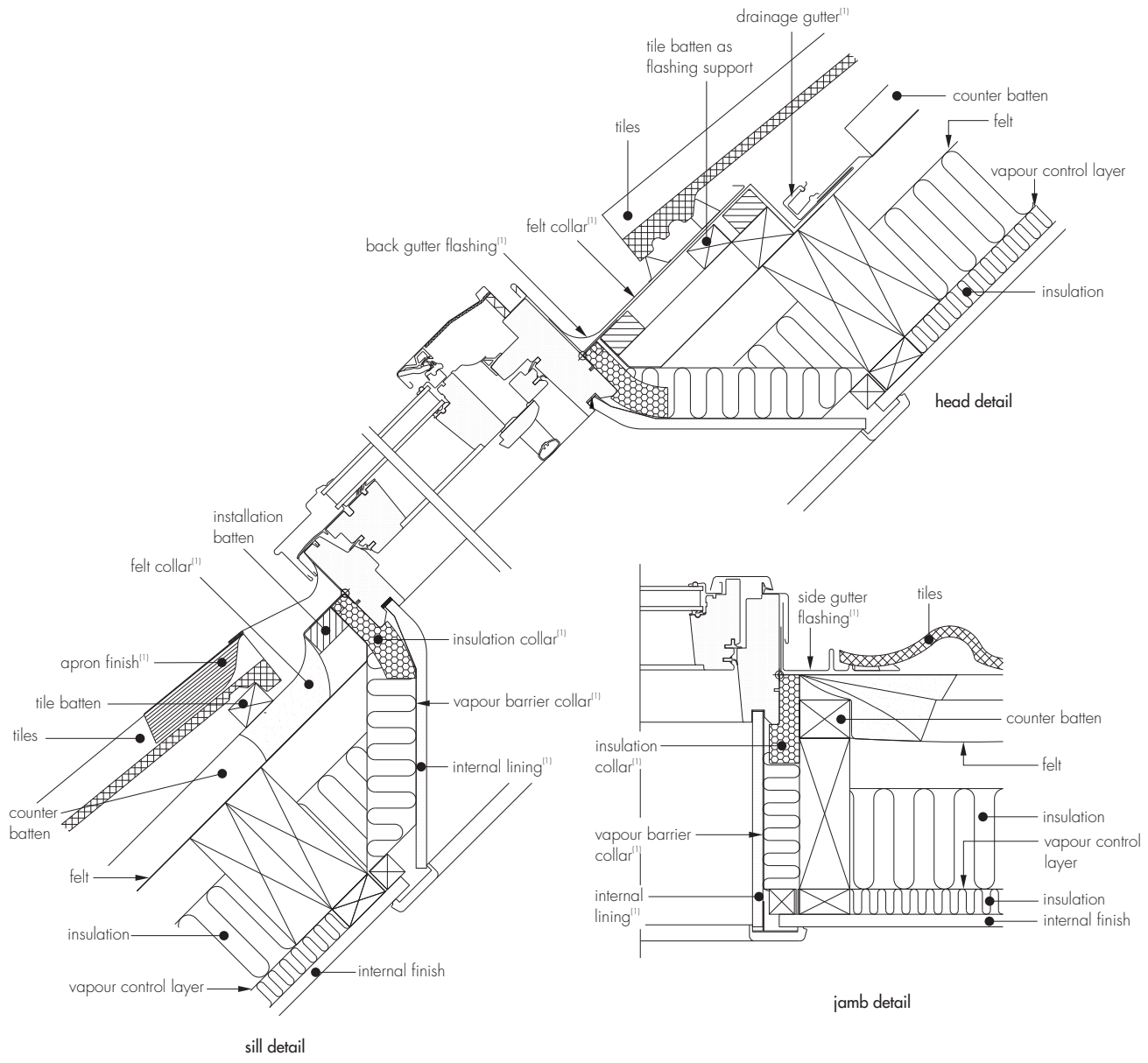


Figure 2 VELUX GGL and GGU Centre Pivot Roof Windows

GGL

GGU

Figure 3 Typical window installation



(1) Can be supplied by VELUX but are outside the scope of this Certificate.

1.3 The range comprises single-opening lights revolving about a centre pivot subject to the size restrictions shown in Table 1.

Table 1 Size range

Manufacturer's size code	Modular size width x height (mm)	GGL	GGU	Outer frame dimensions (mm)		Sash dimensions (mm)	
				Width	Height	Width	Height
C02	550 x 778	✓	✓	550	778	460	703
C04	550 x 978	✓	✓	550	978	460	903
F06	660 x 1178	✓	✓	660	1178	570	1103
M04	780 x 978	✓	✓	780	978	690	903
M06	780 x 1178	✓	✓	780	1178	690	1103
M08	780 x 1398	✓	✓	780	1398	690	1323
P08	942 x 1389	✓	✓	942	1398	852	1323
P10	942 x 1600	✓	✓	942	1600	852	1525
S06	1140 x 1178	✓	✓	1140	1178	1050	1103
U04	1340 x 978	✓	✓	1340	978	1250	903
U08	1340 x 1398	✓	✓	1340	1398	1250	1323

1.4 A specific range of the products, conservation roof windows, is available for use in conservation areas. These windows are covered with black coil-coated aluminium covers (see Figure 4) on the external face and clear satin water-based lacquer on the internal faces of the frames and sashes and are supplied complete with mullion.

Figure 4 Conservation 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 24 mm and 32 mm sealed double- and triple-glazed, argon- or krypton-filled units featuring low emissivity coating of emissivity (ε_n) = 0.03 (declared value) (see Table 2), with a combination of float, toughened or laminated glass. Glazing units carry CE marking to show compliance with BS EN 1279-5 : 2005.

Table 2 Glazing units

Pane variant	Glass unit specification[1]
34	4 mm obscure glass/16 mm argon-filled cavity/4 mm toughened glass with low-E coating
59	4 mm float glass with low-E coating/16 mm argon-filled cavity/4 mm toughened glass
60	33.1 laminated glass/12 mm krypton-filled cavity/6 mm toughened glass with low-E coating
65	22.1 laminated glass/10 mm krypton-filled cavity/4 mm toughened glass with low-E coating/10 mm krypton filled cavity/4 mm toughened glass with low-E coating
73	33.1 laminated glass/14.5 mm argon-filled cavity/4 mm toughened glass with low-E coating

(1) Inner pane/cavity/outer pane.

1.7 The aluminium profiles protecting the outer frame and sash are fabricated from aluminium sheet alloys. The thickness of the aluminium covers depends on the component. The covers are secured to the wood core with painted stainless steel screws.

1.8 The coil-coating on the aluminium components is available in grey finish as standard and black for the conservation windows.

1.9 Glazing units are sealed into the wooden sash using various rubber gaskets on the inside and butyl putty on the outside. The glazing unit is secured with aluminium glazing profiles.

1.10 The windows are operated by the upper control bar, constructed from anodized aluminium alloy in natural finish for the GGL and white polyurethane lacquer finished moulded polyurethane for the GGU. The centre pivot hinges are constructed from chrome passivated steel. They allow the sash to be turned through 180° and secured in position by engaging a barrel bolt for cleaning and maintenance. A key operated lock is available and can be fitted at the top of the frame jamb.

1.11 Alternatively the GGL and GGU roof windows can be supplied with the pre-installed INTEGRA wireless remote control operating system allowing the opening light to be opened to 200 mm. The system includes pre-fitted motor, remote control and rain sensor (see Figure 5). The motor chain can be disengaged from the sash allowing it to be rotated manually for cleaning of the outer pane.

Figure 5 INTEGRA window

1.12 Weatherstripping is located in the grooves around the periphery of the opening light frame below the hinge axis and around the outer frame above the hinge axis. An additional inner gasket is located around the periphery of the opening light of GGL windows. The control bar includes a self-adhesive foam draftstrip.

1.13 The windows are equipped with a built-in background ventilator equipped with a built-in open mesh dust and insect filter fitted in the top casing on the external face of the frame.

2 Manufacture

2.1 VELUX GGL Centre Pivot Roof Windows are fabricated from preserved multi-laminated softwood frames and sashes featuring coil-coated aluminium on the external faces. VELUX GGU Centre Pivot Roof Windows are fabricated from a timber core surrounded by moulded polyurethane frames and sashes. They feature coil-coated aluminium covers on the external faces.

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

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

2.3 The management systems of the VELUX companies, where the products are manufactured, have been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008.

3 Delivery and site handling

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

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

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

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

Assessment and Technical Investigations

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

Design Considerations

4 Use

4.1 VELUX Centre Pivot Roof Windows are suitable for use on roofs of domestic and commercial buildings with a pitch between 15° and 90°, to provide natural light and ventilation. New roofs should be designed in accordance with the relevant Building Regulations.

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

5 Practicability of installation

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

5.2 Although installation of the products may be achieved by competent personnel, the provision of a new electrical circuit and the connection of this to the supply should be carried out only by a suitably qualified electrician in accordance with the requirements of Approved Document P and BS 7671 : 2008 (see sections 16.1 to 16.4 and the *Installation* part of this Certificate).

6 Thermal insulation

6.1 VELUX centre pivot roof windows incorporating a sash glazed with 24 mm sealed double-glazed unit or 32 mm sealed triple-glazed unit (see Table 2) will achieve the thermal transmittance values (U values) shown in Table 3.

Table 3 Thermal transmittance values

Pane variant	Thermal transmittance value ($W \cdot m^{-2} \cdot K^{-1}$)
34	1.4
59	1.4
60	1.3
65	1.0
73	1.4

6.2 For the purposes of heat loss calculations, the U values in Table 3 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 Weathertightness

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

7.2 The windows are suitable for use as indicated in Table 4. The classifications are based on the assumption that the outer frame is secured and installed in accordance with the manufacturer's instructions.

Table 4 Weathertightness classifications

	Classification to		
	BS EN 12207 : 2000	BS EN 12208 : 2000	BS EN 12210 : 2000
Air permeability[1]	Class 3		
Watertightness[1]		Class 9A	
Wind resistance[1]			Class C3

(1) Window tested in the vertical position.

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

8 Structural stability

8.1 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.

8.2 The magnitude 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.

8.3 Details of connections between the roof window and the roof must be entrusted to a suitably-qualified and experienced individual. Guidance is available from the installation instructions and the Certificate holder.

9 Ventilation

9.1 The approximate opening area for rapid natural ventilation is given in Table 5.

Table 5 Approximate opening area for rapid natural ventilation

Manufacturer's size code	Modular size width x height (mm)	Opening area for rapid natural ventilation (m^2)	Opening area for rapid natural ventilation for INTEGRA windows (m^2)
C02	550 x 778	0.24	0.16
C04	550 x 978	0.33	0.17
F06	660 x 1178	0.53	0.20
M04	780 x 978	0.51	0.23
M06	780 x 1178	0.64	0.24
M08	780 x 1398	0.79	0.25
P08	942 x 1389	0.98	N/A
P10	942 x 1600	1.15	0.30
S06	1140 x 1178	0.99	0.34
U04	1340 x 978	0.94	0.39
U08	1340 x 1398	1.45	0.41

9.2 Contribution to the background ventilation requirements of the various Building Regulations can be made by the air vent incorporated in the roof windows.

9.3 The equivalent area of the vents is given in Table 6.

Table 6 Equivalent area of vents per metre width of window

Vent	Equivalent area ($mm^2 \cdot m^{-1}$)
Double-glazed windows	4030
Triple-glazed windows	2214

9.4 The vents' geometric area will be greater than the equivalent areas in Table 6, however the integral mesh makes a determination impractical. Users in Scotland should, therefore, take the relevant equivalent area in Table 6 when considering requirements for minimum geometric area.

10 Behaviour in relation to fire

10.1 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.

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

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

11 Glass area

The approximate glass area of the windows is given in Table 7.

Table 7 Approximate glass area

Manufacturer's size code	Glass area (m^2)
C02	0.20
C04	0.27
F06	0.45
M04	0.44
M06	0.56
M08	0.69
P08	0.88
P10	1.03
S06	0.90
U04	0.85
U08	1.34

12 Condensation risk

Experience of products similar to the VELUX 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 some satisfactory 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*. See also section 9 of this Certificate.

13 Safety

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

13.2 Account must be taken of the recommendations given in BS 6262-4 : 2005, which include the use of safety glass, complying with BS EN 12600 : 2002, under certain circumstances.

14 Security against intrusion

14.1 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* 2013, Chapter 6.7, *Doors, windows and glazing*. It is the responsibility of the building designer to specify where these requirements need to be satisfied.

14.2 The arrangement of the aluminium cladding and glazing retaining profiles ensures that removal of the glass is difficult from the outside.

15 Ease of operation

The window can be operated without difficulty when correctly installed.

16 Provision of an electrical supply and electrical safety

16.1 For electrical safety, provision of an electrical supply and the permanent connection of the INTEGRA unit to the supply should be carried out by a qualified electrician.

16.2 The product is supplied with a 13 A fused plug for connection to an existing standard electric socket. The product can also be permanently connected to a suitable mains electrical supply through a 13 A fused isolating spur. The provision of the electrical supply should be in accordance with the BS 7671 : 2008.

16.3 In England and Wales, all installations must meet the requirements of The Building Regulations 2010 (England and Wales) (as amended), Part P *Electrical Safety*.

16.4 In Scotland, to meet the requirements of Mandatory Standard 4.5, with reference to clause 4.5.1[1] of The Building (Scotland) Regulations 2004 (as amended), all installations should be designed, constructed and tested such that they are in accordance with the requirements of BS 7671 : 2008.

(1) Technical Handbook (Domestic).

17 Maintenance

17.1 The external pane of the glazing unit can be cleaned from inside the building.

17.2 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.

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

17.4 Maintenance painting of the internal finishes should be considered at the intervals defined in section 18.4 of this Certificate or earlier, if a high aesthetic standard is required. The Certificate holder can recommend a suitable paint and maintenance system (outside the scope of this Certificate).

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

17.6 The pivot hinges are designed to be maintenance free. The locking mechanism can be lubricated periodically to minimise wear and to ensure smooth operation.

17.7 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. Further details are available from the maintenance instructions supplied with the windows or the Certificate holder. 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 internal finish will maintain an acceptable appearance up to 10 years. This 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 (outside the scope of this Certificate).

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

18.6 The durability of the window components for the GGL and GGU INTEGRA roof windows is the same as that given in sections 18.1 to 18.5 of this Certificate. The electrical components may need replacing within the overall life of the window.

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

Installation

19 General

19.1 VELUX Centre Pivot Roof Windows must be fixed into the opening, in accordance with the recommendations in the *VELUX Installation Instructions*, using the supplied mounting brackets, made from galvanized zinc, screwed to the window frame and rafters. 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.

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, an suitably qualified and experienced individual should be consulted.

19.3 When preparing the opening to accept the roof window, the tolerance indicated within the installation instructions should be used.

19.4 The window must be positioned, in relation to the type of roofing material, as indicated within the installation instructions. In the case of metal roof sheets or similar, the window must be installed above a horizontal lap. In the case of roofing materials having a depth of more than 45 mm (for example pantiles, profiled sheets and corrugated fibre-cement sheets), it is necessary that the upper edge of the roofing material is chamfered immediately below the window.

19.5 When installing the window, the distances indicated in the manufacturer's installation instructions between the edge of the window and roofing material must be maintained.

19.6 The window is fitted using four or six angle brackets depending on the size of the window. The optimum width spacing between the rafter facings should be close to the width of the window plus 40 mm to 60 mm larger than it. In the case of a roof having a different spacing between the rafters additional timber bridging support must be provided.

19.7 The battens or roof boarding is cut, where the window is to be fitted, to the width and height indicated within the installation instructions.

20 Procedure

Preparation of the window

20.1 The timber and polystyrene packaging pieces, supplied with the window, and the sash are removed in accordance with the manufacturer's instructions.

20.2 The supplied mounting brackets are fixed to the corners of the outer frame in predefined positions in accordance with the manufacturer's instructions.

Mounting the window on the roof

20.3 The frame is fitted into the prepared opening in the roof ensuring that it lies flat using a spirit level and that the red line on the outside of the frame is level with the top of the battens or boarding. For recessed installations refer to the installation instructions supplied with the particular flashing.

20.4 The lower mounting brackets are fixed through the batten and into the rafter using two screws and the top mounting brackets are fixed initially using one screw through the battens. The opening light frame is fitted into the frame and adjusted in accordance with the manufacturer's instructions and the top mounting brackets are secured using a second screw through the battens and into the rafters.

20.5 The roof tile underlay/damp-proof membrane (dpm) is secured around the perimeter of the roof window.

20.6 Installation is completed by fixing appropriate covers and flashings (see sections 1.1, 1.2 and 1.5) in accordance with the manufacturer's instructions.

Installation of INTEGRA windows

20.7 The windows are installed as previously stated.

20.8 The rain sensor is installed when all the window cover parts have been installed. The cable must not be connected to the mains supply until the window has been completely installed following the manufacturer's instructions.

Technical Investigations

21 Tests

21.1 Tests were carried out to determine:

- watertightness
- efficiency of window fittings
- corrosion resistance of window fittings
- mechanical loading tests
- ease of operation
- basic security test.

21.2 The clear satin lacquer and white paint applied to the interior face was tested to determine:

- gloss retention after artificial weathering
- fungal resistance
- extensibility of applied film
- water vapour permeability
- abrasion resistance
- scratch resistance
- adhesion of coating.

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

- resistance to sulfur dioxide
- resistance to salt spray
- resistance to artificial weathering
- adhesion to substrate
- resistance to scratching.

21.4 Independent test data were examined relating to:

- air permeability
- watertightness
- effect of wind loads
- thermal transmittance
- load bearing capacity of safety devices
- air vent
- durability of window fittings.

22 Investigations

22.1 Assessments were evaluated and carried out relating to the U values of the windows with various glazing options.

22.2 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

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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

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.

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