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Agrément Certificate  
**09/4712**  
Product Sheet 1

### SPECTUS PVC-U WINDOW SYSTEMS

### ELITE 70 OUTWARD OPENING AND TILT AND TURN SYSTEMS

#### PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the Elite 70 Outward Opening and Tilt and Turn Systems, in white finish, for use in walls of domestic and non-domestic buildings for replacement and new build applications.

#### AGRÉMENT 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 properties** — the thermal transmittance (U value) of the outward opening windows was measured as between  $1.7 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  to  $1.9 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  using the Guarded Hot Box method according to BS EN ISO 12567-1 : 2000. The Certificate holder has achieved BFRC ratings (see section 5).

**Weathertightness** — the systems can be used in the exposure situations described in this Certificate (see section 6).

**Ventilation** — opening lights can provide rapid ventilation (see section 7).

**Basic security against intrusion** — the windows meet the basic requirements of NHBC (see section 8).

**Durability** — the PVC-U frames will have a life of at least 35 years (see section 15).

The BBA has awarded this Agrément Certificate to the company named above for the systems described herein. These systems have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Handwritten signature of Chris Hunt in black ink.

Chris Hunt  
Head of Approvals — Physics

Handwritten signature of Greg Cooper in black ink.

Greg Cooper  
Chief Executive

Date of First issue: 19 January 2010

*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](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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In the opinion of the BBA, Elite 70 Outward Opening and Tilt and Turn Systems, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



### The Building Regulations 2000 (as amended) (England and Wales)

<b>Requirement:</b> B1	<b>Means of warning and escape</b>
Comment:	Windows of an appropriate size can be used as an escape route from floors not more than 4.5 m above ground level. See sections 10.1 and 10.2 of this Certificate.
<b>Requirement:</b> C2(b)	<b>Resistance to moisture</b>
Comment:	The systems have adequate resistance to the ingress of rain and wind driven spray and so can contribute towards the wall satisfying this Requirement. See Table 3 of this Certificate.
<b>Requirement:</b> C2(c)	<b>Resistance to moisture</b>
Comment:	The systems will not constitute a significant condensation risk and so can contribute towards the wall satisfying this Requirement. See section 11.1 of this Certificate.
<b>Requirement:</b> F1	<b>Means of ventilation</b>
Comment:	In assessing the contribution of the systems to natural purge ventilation, the area of opening should be calculated in accordance with section 7.1 in this Certificate and related to floor area as set out in Approved Document F.
<b>Requirement:</b> L1(a)(i)	<b>Conservation of fuel and power</b>
Comment:	In meeting this Requirement, the U values given in sections 5.1, 5.2 and 5.4 of this Certificate may be used. Alternatively the guidance in section 5.3 may be used.
<b>Requirement:</b> N3	<b>Safe opening and closing of windows etc</b>
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 sections 12.1 and 12.2 of this Certificate.
<b>Requirement:</b> N4	<b>Safe access for cleaning windows etc</b>
Comment:	In buildings other than dwellings, this Requirement can be met when opening lights can be safely cleaned from inside the building. See section 14.1 of this Certificate.
<b>Requirement:</b> Regulation 7	<b>Materials and workmanship</b>
Comment:	The systems are acceptable. See sections 15.1, 15.2 and the <i>Installation</i> part of this Certificate.



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

<b>Regulation:</b> 8(1)(2)	<b>Fitness and durability of materials and workmanship</b>
Comment:	The systems satisfy this Regulation. See sections 14.5, 14.6, 15.1, 15.2 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b> 9	<b>Building Standards – construction</b>
<b>Standard:</b> 2.9	<b>Escape</b>
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. See sections 10.1 and 10.2 of this Certificate.
<b>Standard:</b> 3.10	<b>Precipitation</b>
Comment:	The systems have adequate resistance to the ingress of rain and wind driven spray and so can contribute towards the wall satisfying this Standard, with reference to clause 3.10.1 <sup>(1)(2)</sup> . See Table 3 of this Certificate.
<b>Standard:</b> 3.14	<b>Ventilation</b>
Comment:	In calculating the contribution of the systems to natural ventilation with reference to clauses 3.14.2 <sup>(1)(2)</sup> and 3.14.3 <sup>(1)</sup> to this Standard, the area of opening can be calculated in accordance with section 7.1 of this Certificate.
<b>Standard:</b> 3.15	<b>Condensation</b>
Comment:	The systems will not constitute a significant condensation risk and so can contribute towards the wall satisfying this Standard, with reference to clauses 3.15.1 <sup>(1)</sup> and 3.15.4 <sup>(1)</sup> . See section 11.1 of this Certificate.
<b>Standard:</b> 3.16	<b>Natural lighting</b>
Comment:	In calculating the contribution of the systems to natural lighting, with reference to clause 3.16.1 <sup>(1)</sup> and 3.16.3 <sup>(1)</sup> to this Standard, the area of glazing can be calculated in accordance with section 9 of this Certificate.
<b>Standard:</b> 4.8(c)	<b>Danger from accidents</b>
Comment:	Opening lights that can be safely cleaned from inside the building can satisfy this Standard, with reference to clause 4.8.3 <sup>(1)(2)</sup> . See section 14.1 of this Certificate.
<b>Standard:</b> 4.8(e)	<b>Danger from accidents</b>
Comment:	Opening lights that can be opened, closed and adjusted safely satisfy this Standard, with reference to clause 4.8.5 <sup>(1)(2)</sup> . See sections 12.1 and 12.2 of this Certificate.
<b>Standard:</b> 6.1(a)(b)	<b>Carbon dioxide emissions</b>
<b>Standard:</b> 6.2	<b>Building insulation envelope</b>
Comment:	In satisfying these Standards, with reference to clauses 6.1.3 <sup>(1)(2)</sup> , 6.2.1 <sup>(1)(2)</sup> , 6.2.2 <sup>(1)(2)</sup> , 6.2.3 <sup>(1)</sup> , 6.2.4 <sup>(2)</sup> , 6.2.7 <sup>(1)</sup> , 6.2.8 <sup>(2)</sup> , 6.2.9 <sup>(1)</sup> and 6.2.10 <sup>(2)</sup> , the U value given in section 5.1 and 5.2 of this Certificate may be used. Alternatively the guidance in section 5.3 and 5.5 may be used.

<b>Regulation:</b>	12	<b>Building standards – conversions</b>
<b>Comment:</b>	All comments given for these systems under Regulation 9, 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) 2000 (as amended)

<b>Regulation:</b>	B2	<b>Fitness of materials and workmanship</b>
<b>Comment:</b>	The systems are acceptable. See sections 15.1, 15.2 and the <i>Installation</i> part of this Certificate.	
<b>Regulation:</b>	B3(2)	<b>Suitability of certain materials</b>
<b>Comment:</b>	The systems are acceptable. See sections 14.5 and 14.6 of this Certificate.	
<b>Regulation:</b>	C4(b)	<b>Resistance to ground moisture and weather</b>
<b>Comment:</b>	The systems have adequate resistance to the ingress of rain and wind driven spray and so can contribute towards the wall satisfying this Regulation. See Table 3 of this Certificate.	
<b>Regulation:</b>	E2(c)	<b>Means of escape</b>
<b>Comment:</b>	Windows of an appropriate size can be used as an escape route in dwellings. See sections 10.1 and 10.2 of this Certificate.	
<b>Regulation:</b>	F2(a)(i)	<b>Conservation measures</b>
<b>Regulation:</b>	F3	<b>Target carbon dioxide Emissions Rate</b>
<b>Comment:</b>	In satisfying these Regulations, the U values given in sections 5.1, 5.2 and 5.4 of this Certificate may be used. Alternatively the guidance in section 5.3 may be used.	
<b>Regulation:</b>	K2	<b>Means of ventilation</b>
<b>Comment:</b>	When calculating the area of window openings for ventilation purposes, see section 7.1 of this Certificate.	
<b>Regulation:</b>	V4	<b>Safe opening and closing of windows, skylights and ventilators</b>
<b>Comment:</b>	The requirements of this Regulation shall be deemed to be satisfied if the window complies with Technical Booklet V, Section 4. See sections 12.1 and 12.2 of this Certificate.	
<b>Regulation:</b>	V5	<b>Safe means of access for cleaning glazing</b>
<b>Comment:</b>	Opening lights that can be safely cleaned from inside the building can satisfy this Regulation. 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 section: 2 *Delivery and site handling* (2.3 and 2.4).

## Non-regulatory Information

NHBC accepts the use of Elite 70 Outward Opening and Tilt and Turn Systems, when installed and used in accordance with this Certificate, in relation to *NHBC Standards, Chapter 6.7 Doors, windows and glazing*.

## Technical Specification

### 1 Description

1.1 Elite 70 Outward Opening and Tilt and Turn Systems, comprise single top-hung, side-hung and tilt and turn windows and multilight windows, including opening lights and fixed lights, all framed in white finish PVC-U and glazed internally or externally with sealed double-glazed units<sup>(1)</sup>.

(1) Outside the scope of this Certificate.

1.2 The windows are fabricated from white finish, unplasticised polyvinyl chloride (PVC-U) profiles, produced by conventional extrusion techniques from material complying with BS EN 12608 : 2003. The profiles covered by this Certificate (listed in Table 1 and shown in Figure 1) are supplied with integral gaskets made from black or white TPE material, eliminating the need for separate weatherseals and glazing gaskets.

Table 1 Profiles

Manufacturer's designation	Profile type	Application	Outward Opening	Tilt and Turn
B01	L-section	outer frame (50 mm)	✓	—
B02	L-section	outer frame (60 mm)	✓	✓
B03	L-section	outer frame (70 mm)	✓	✓
B05	L-section	outer frame (50 mm)	✓	—
B06	L-section	outer frame (60 mm)	✓	✓
B07	L-section	outer frame (70 mm)	✓	✓
B10	T-section	transom/mullion (66 mm)	✓	—
B11	Z-section	transom/mullion (66 mm)	✓	—
B14	T-section	transom/mullion (110 mm)	✓	✓
B15	Z-section	transom/mullion (110 mm)	✓	—
B16	T-section	transom/mullion (90 mm)	✓	✓
B17	Z-section	transom/mullion (90 mm)	✓	—
B20	T-section	transom/mullion (66 mm)	✓	—
B21	Z-section	transom/mullion (66 mm)	✓	—
B22	T-section	transom/mullion (76 mm)	✓	✓
B23	Z-section	transom/mullion (76 mm)	✓	—
B24	T-section	transom/mullion (110 mm)	—	✓
B25	Z-section	transom/mullion (110 mm)	✓	—
B30	T-section	sash	✓	—
B31	Z-section	sash	✓	—
B33	Z-section	sash	—	✓
B35	T-section	sash	✓	—
B36	Z-section	sash	✓	—
B38	Z-section	sash	—	✓
150.55CV	—	sill (150 mm)	✓	✓
180.55CV	—	sill (180 mm)	✓	✓
B50	—	glazing bead (28 mm)	✓	✓
B60	—	glazing bead (28 mm)	✓	✓
B61	—	glazing bead (24 mm)	✓	✓
BR05S	—	galvanized steel reinforcement (B01, B05)	✓	—
BR06	—	aluminium reinforcement (B02, B06, B22)	✓	✓
BR06S	—	galvanized steel reinforcement (B02, B06, B10, B11, B20, B21, B22, B23)	✓	✓
BR07	—	aluminium reinforcement (B03, B07)	✓	✓
BR07S	—	galvanized steel reinforcement (B03, B07)	✓	✓
BR16	—	aluminium reinforcement (B16, B17)	✓	✓
BR16S	—	galvanized steel reinforcement (B16, B17)	✓	✓
BR17S	—	galvanized steel reinforcement (B16, B17)	✓	✓
BR20	—	aluminium reinforcement (B10, B11, B20, B21)	✓	—
BR20S	—	galvanized steel reinforcement (B01, B05, B10, B11, B20, B21)	✓	—
BR21	—	aluminium reinforcement (B01, B05, B10, B11, B20, B21)	✓	—
BR21S	—	galvanized steel reinforcement (B01, B05, B10, B11, B20, B21)	✓	—
BR22	—	aluminium reinforcement (B22, B23)	✓	✓
BR22S	—	galvanized steel reinforcement (B10, B11, B20, B21, B22, B23)	✓	✓
BR24	—	aluminium reinforcement (B14, B15, B24, B25)	✓	✓
BR24S	—	galvanized steel reinforcement (B14, B15, B24, B25)	✓	✓
BR33S	—	galvanized steel reinforcement (B33, B38)	✓	✓
BR35	—	aluminium reinforcement (B30, B31, B35, B36)	✓	—
BR35S	—	galvanized steel reinforcement (B30, B31, B35, B36)	✓	—
133700	—	replacement weatherseal	✓	✓

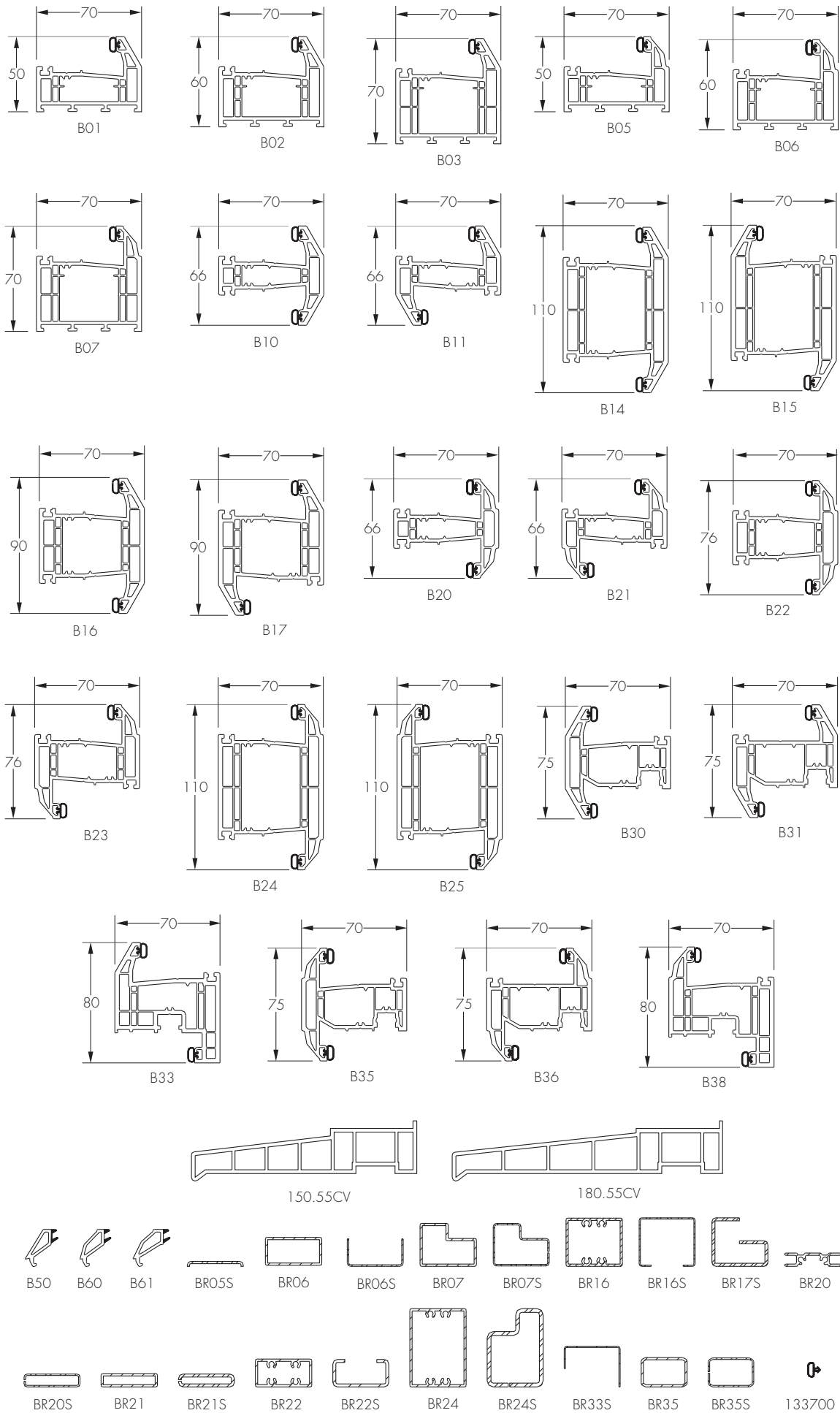
1.3 The Certificate holder should adhere to the methods of selection, machining and assembly of frame components as detailed in the *Elite 70 Casement and Tilt & Turn Manuals*.

1.4 Multilight windows incorporate mullions and transoms connected to the outer frame and, where relevant, to each other by means of welded or mechanical joints.

1.5 The systems are fabricated using conventional production processes for PVC-U windows. Where mullions and transoms are mechanically jointed the outer frame is screwed through to aluminium reinforcement inserted in the mullion or transom in accordance with the instructions in the *Elite 70 Casement and Tilt & Turn Manuals*.

1.6 Drainage is provided by a series of slots, 5 mm by 30 mm, and holes, 5 mm in diameter, positioned in accordance with the *Elite 70 Casement and Tilt & Turn Manuals*. In general, on multilight units each element is treated as a separate window and drainage slots cut accordingly, to retain symmetry where possible.

Figure 1 Profiles (all dimensions in mm)



## Reinforcement

1.7 Outer frame head members are reinforced with galvanized mild steel where their length exceeds 1350 mm, in accordance with the *Elite 70 Casement and Tilt & Turn Manuals*.

1.8 For side-hung opening lights the horizontal members are always reinforced with aluminium or galvanised steel reinforcement and the vertical members where their length exceeds 800 mm in accordance with the *Elite 70 Casement Manual*. For top-hung opening lights the horizontal members are reinforced with aluminium or galvanised steel reinforcement where their length exceeds 800 mm and the vertical members where their length exceeds 600 mm in accordance with the *Elite 70 Casement Manual*. For tilt and turn opening lights the horizontal members are always reinforced with galvanised steel reinforcement and the vertical members where their length exceeds 800 mm in accordance with the *Elite 70 Tilt & Turn Manual*.

1.9 Welded mullions and transoms are reinforced with galvanized mild steel where their length exceeds 1000 mm and mechanically jointed mullions and transoms are always reinforced in accordance with the *Elite 70 Casement and Tilt & Turn Manuals*.

1.10 Galvanized steel reinforcement is roll-formed from material with a Z275N coating complying with BS EN 10346 : 2009. Aluminium reinforcement is extruded from alloy type 6063-T6 to BS EN 755-2 : 2008.

## Size range

1.11 This Certificate covers Elite 70 outward opening top-hung, side-hung and tilt and turn and fixed-light windows and combinations of these within the limitations shown in Table 2.

Table 2 Size restriction

	Dimension (mm)
<b>Outward Opening windows</b>	
Maximum overall width or height of any outer frame	2140
Maximum length of mullions or transoms	1800
<b>Top-hung opening lights</b>	
Maximum size of top-hung opening light reinforced <sup>(1)</sup> (separately or in a multilight)	1244 wide x 1244 high
<b>Side-hung opening lights</b>	
Maximum size of side-hung opening light reinforced <sup>(1)</sup> (separately or in a multilight)	714 wide x 1464 high or 764 wide x 1364 high
<b>Tilt and Turn windows</b>	
Maximum overall width or height of any outer frame	1800
Maximum length of mullions or transoms	1800
Maximum size of a single tilt and turn opening light	1584 wide x 1584 high
<b>Fixed lights reinforced</b>	3000 wide x 2000 high

(1) Opening light sizes refer to outer frame to outer frame, or outer frame to mullion/transom centre line dimension, and must not exceed limitations on weight or size imposed by the friction hinge manufacturer.

## Fittings

1.12 For outward opening windows top-hung and side-hung windows covered by this Certificate are fitted with friction hinges constructed from stainless steel type 1.4016 to BS EN 10088-2 : 2005. The hinges incorporate a plastic slider which can be adjusted by means of a brass screw or a die-cast, slot-headed cam to provide the necessary braking action. The hinges are fixed to the frames with screws. Opening windows are fastened by means of concealed shootbolt locking systems constructed from materials assessed and approved by the BBA.

1.13 Tilt and turn windows are fitted with specific types of tilt and turn mechanism comprising an espagnolette type locking system, hinges and a tilt stay, all formed from materials assessed and approved by the BBA. The mechanism incorporates locking rollers and, as an option, shootbolt locks which engage with keeps fixed to the outer frame, and is operated with a handle. The tilt and turn mechanism locates in a purpose-made groove in the opening light profile.

1.14 Shootbolt and tilt and turn handles are available, as an option, with a key locking facility. The shootbolt, keeps and tilt and turn mechanism are fixed by means of self-tapping screws which penetrate a thickened area of the profile wall or the reinforcing. The shootbolt and tilt and turn handles with various finishes are formed from materials assessed and approved by the BBA.

1.15 Additional components are available from the range of fittings to restrict the opening of the window to a maximum distance of 100 mm.

## Glazing

1.16 Windows are supplied factory glazed or ready for glazing using double-glazed units with glass thicknesses in accordance with BS 6262-1 : 2005. All glass is positioned by plastic setting blocks and packing pieces.

1.17 The glazing units should meet the requirements of BS EN 1279-2 : 2002 and (if relevant) BS EN 1279-3 : 2002.

## Weatherstripping and gaskets

1.18 The integral black or white gaskets and weatherstripping are incorporated onto the profiles by post calibration co-extrusion (PCE) (see Figure 1). The double-glazed unit is secured by co-extruded bead.

## Quality control

1.19 Quality control checks are carried out on the incoming materials during production and on the finished products.

## 2 Delivery and site handling

2.1 The windows are delivered to site glazed or ready for glazing. For transportation they are suitably protected to avoid damage.

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

2.3 The weight of glazing can be calculated, where required for manual handling operations, by reference to the information contained in BS 952-1 : 1995. The weight of the unglazed frame, and its ease of handling, particularly by one person, must also be taken into account when planning site operations.

2.4 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 Elite 70 Outward Opening and Tilt and Turn Systems.

## Design Considerations

### 3 Use

Elite 70 Outward Opening and Tilt and Turn Systems are satisfactory for use as windows installed vertically into the external walls of domestic and non-domestic buildings for replacement and new build applications.

### 4 Practicability of installation

The systems are designed to be installed by a competent general builder, or a contractor, experienced with this type of system.

### 5 Thermal properties



5.1 The thermal transmittance (U value) of an Elite 70 outward opening window, 1230 mm wide by 1480 mm high, incorporating a side-hung opening light and a fixed-light, glazed with 4/20/4 mm sealed, double-glazed unit with a low-E hard coating of emissivity ( $\epsilon_n$ ) = 0.15 Pilkington K glass when measured by the Guarded Hot Box Method according to BS EN ISO 12567-1 : 2000, is  $1.9 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ .

5.2 The thermal transmittance (U value) of an Elite 70 outward opening window, 1230 mm wide by 1480 mm high, incorporating a side-hung opening light and a fixed-light, glazed with 4/20/4 mm sealed, double-glazed unit with a Pilkington Optitherm SN low-E coated glass and Pilkington Activ (self cleaning) glass when measured by the Guarded Hot Box Method according to BS EN ISO 12567-1 : 2000, is  $1.7 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ .

5.3 The overall thermal insulation of the window will be dependent on the performance of the double-glazed units. For units other than those described above, the indicative U values shown in Table 6e of SAP 2005 *The Government's Standard Assessment Procedure for Energy Rating of Dwellings* and Table 6.A.1 of Annex 6.A<sup>(1)(2)</sup> of Technical Handbook, Section 6, of The Building (Scotland) Regulations 2004 can be used. When available, a certified U value by measurement to BS EN ISO 12567-1 : 2000, or calculation to BS EN ISO 10077-1 : 2006 and BS EN ISO 10077-2 : 2003 should be used in preference to these data given in these tables. Alternatively, window energy ratings may be available for specific frame and glazing combinations. Details can be obtained by visiting the BFRC website ([www.bfrc.org](http://www.bfrc.org)).

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



5.4 In replacement work, an average elemental U value of  $2.0 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  (dwellings) or  $2.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  (buildings other than dwellings) is required for PVC-U windows. These can be met by the use of 4/16/4 mm double-glazed units with a low-E coating of emissivity ( $\epsilon_n$ ) = 0.15 or better. Alternatively, for domestic buildings, a window with a BFRC window energy rating of Band 'E' for replacement work is acceptable. New windows in extensions require a U value of  $1.8 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  or a BFRC window energy rating of Band 'D'.



5.5 For the average elemental U values in Scotland, the guidance provided in Mandatory Standard 6.2 clauses 6.2.9<sup>(1)</sup> and 6.2.10<sup>(2)</sup> for new windows in extensions and clauses 6.2.11<sup>(1)</sup> and 6.2.12<sup>(2)</sup> for replacement work should be followed.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

### 6 Weathertightness

6.1 Selected samples from the systems were tested generally in accordance with BS 7412 : 2002, BS 6375-1 : 1989 and BS 6375-1 : 2004 and are suitable for use as indicated in Table 3. The gradings are based on the assumption that the outer frame is supported on all four sides in accordance with the manufacturer's instructions.

Table 3 Test pressure class, exposure categories and classification

	BS 6375-1 : 1989 Test pressure class (Pa)	BS 6375-1 : 2004 Classification
<b>Strength and stability/Resistance to wind</b>		
<i>Outward opening</i>		
<i>Multilights units</i>		
width up to a maximum of 2140 mm, height up to a maximum of 2140 mm, perimeter up to a maximum 6560 mm with mullion or transom lengths not exceeding		
1140 mm with BR20 aluminium reinforcement	2000	—
1140 mm with BR20S steel reinforcement	2700	—
width up to a maximum of 1400 mm, height up to a maximum of 1400 mm, perimeter up to a maximum 5400 mm with mullion or transom lengths not exceeding		
1300 mm with BR20S steel reinforcement	1200	—
width up to a maximum of 1400 mm, height up to a maximum of 1400 mm, perimeter up to a maximum 4800 mm with mullion or transom lengths not exceeding		
1400 mm with BR21S steel reinforcement	800	—
width up to a maximum of 1500 mm, height up to a maximum of 1500 mm, perimeter up to a maximum 4600 mm with mullion or transom lengths not exceeding		
1500 mm with BR21S steel reinforcement	1200	—
width up to a maximum of 1300 mm, height up to a maximum of 1300 mm, perimeter up to a maximum 4800 mm with mullion or transom lengths not exceeding		
1300 mm with BR20 aluminium reinforcement	800	—
width up to a maximum of 1800 mm, height up to a maximum of 1800 mm, perimeter up to a maximum 6000 mm with mullion or transom lengths not exceeding		
1800 mm with BR24S steel reinforcement	2400	—
width up to a maximum of 1500 mm, height up to a maximum of 1500 mm, perimeter up to a maximum 5200 mm with mullion or transom lengths not exceeding		
1500 mm with BR24 aluminium reinforcement	1600	—
width up to a maximum of 1200 mm, height up to a maximum of 1200 mm, perimeter up to a maximum 4800 mm with mullion or transom lengths not exceeding		
1200 mm with BR22 aluminium reinforcement (mechanical joint)	—	Class 5 (2000 Pa)
width up to a maximum of 1300 mm, height up to a maximum of 1200 mm, perimeter up to a maximum 5000 mm with mullion or transom lengths not exceeding		
1300 mm with BR06 steel reinforcement	—	Class 5 (2000 Pa)
width up to a maximum of 1150 mm, height up to a maximum of 1200 mm, perimeter up to a maximum 4700 mm with mullion or transom lengths not exceeding		
1150 mm with BR06S steel reinforcement	—	Class 5 (2000 Pa)
width up to a maximum of 1550 mm, height up to a maximum of 1200 mm, perimeter up to a maximum 5500 mm with mullion or transom lengths not exceeding		
1550 mm with BR22S steel reinforcement	—	Class 5 (2000 Pa)
width up to a maximum of 1300 mm, height up to a maximum of 1200 mm, perimeter up to a maximum 5000 mm with mullion or transom lengths not exceeding		
1300 mm with BR16 aluminium reinforcement (mechanical joint)	—	Class 5 (2000 Pa)
width up to a maximum of 1450 mm, height up to a maximum of 1200 mm, perimeter up to a maximum 5300 mm with mullion or transom lengths not exceeding		
1450 mm with BR16S steel reinforcement	—	Class 5 (2000 Pa)
width up to a maximum of 1600 mm, height up to a maximum of 1200 mm, perimeter up to a maximum 5600 mm with mullion or transom lengths not exceeding		
1600 mm with BR17S steel reinforcement	—	Class 5 (2000 Pa)
<i>Individual opening lights</i>		
top-hung	2400	—
side-hung		
714 mm wide x 1464 mm high	2400	—
764 mm wide x 1364 mm high	2400	—
Tilt and turn	—	Class 3 (1200 Pa)
Fixed lights	2400	—
<b>Watertightness</b>		
<i>Multilights</i>		
Outward opening	300	Class 7A (300 Pa)
Tilt and turn	—	Class 5A (200 Pa)
<i>Opening lights</i>		
Top-hung	300	—
Side-hung	300	—
Tilt and turn	—	Class 5A (200 Pa)
Fixed lights	300	—
<b>Air permeability</b>		
<i>Outward opening</i>		
<i>Multilights</i>		
Top-hung	600	Class 4 (600 Pa)
Side-hung	600	—
Side-hung	600	—
Tilt and turn	—	Class 3 (600 Pa)
Fixed lights	600	—

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

## 7 Ventilation



7.1 The opening area for natural ventilation may be calculated by multiplying together the overall width and height dimensions of the frame containing the opening lights reduced by the relevant profile dimensions. For opening lights abutting a mullion or transom, the overall width or height of that element will be given as the dimension from the edge of the outer frame to the centre line of the mullion or transom or, where relevant, between centres of the mullion or transom.

7.2 The background ventilation requirements of the various building regulations can be met by the incorporation in the window of a suitably-sized trickle ventilator. The ventilator may be glazed in, fitted in a supplementary head member or fitted by another method approved by the BBA. Details of any such approved fitting methods can be obtained from the BBA. Details of ventilators covered by an Agrément Certificate can be found on the BBA website.

## 8 Basic security against intrusion

8.1 The opening lights are fitted with lock mechanisms as described in sections 1.13 to 1.15. 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. Key operated locks are required for certain windows to meet the security requirements of *NHBC Standards 2008 Chapter 6.7 Doors, windows and glazing*. It is vital that glass packing is carried out to the manufacturer's recommendations to prevent forced entry by flexing of the frame members allowing disengagement of the lock mechanism.

8.2 Externally-fitted glazing beads can be removed but subsequent removal of the glass without breakage and noise is extremely difficult due to the glazing being additionally secured by glazing clips or security glazing tape. Removal of internally-fitted glazing beads from the outside is extremely difficult.

## 9 Glass area



The approximate unobstructed glass area of the windows is determined by deducting from the overall width and height the appropriate profile dimensions. For each applicable feature, for example, a fixed light would require twice the outer frame dimension to be deducted from the overall width and overall height.

## 10 Unobstructed opening area



10.1 A window can provide an adequate means of escape from a dwelling when it incorporates an opening light that:

- is in a room with a floor not more than 4.5 m above ground level
- is 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 projecting friction stays must be taken into account when the clear opening is determined.

10.2 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 Handbook (Domestic).

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

## 11 Condensation risk



11.1 In normal domestic or similar applications, PVC-U windows will not constitute a significant condensation risk when correctly installed.

11.2 Guidance on some satisfactory design details are given in *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar building*, TSO 2002. and the *Accredited Construction Details*. Further information is contained in BRE report (BR 262 : 2002) *Thermal insulation : avoiding risks*.

## 12 Safety



12.1 When fitted with a restrictor, movement of the opening light can be effectively limited to give an opening of not more than 100 mm, as recommended for child safety in BS 8213-1 : 2004.

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

12.3 Account must be taken of the recommendations given in BS 6262-4 : 2005<sup>(1)</sup>, which includes the use of safety glass and complying with BS EN 12600 : 2002 or BS 6206 : 1981, under certain circumstances.

(1) Dealing with the safety of people upon impact with the glazing.

12.4 Reasonable provision shall be made to minimise the risk of people colliding with an open window when moving in or about a building. For ways of complying with the requirements of the Building Regulations see:

**England and Wales** — Approved Document K (for buildings other than dwellings)

**Scotland** — Standard 4.8(a), clause 4.8.1<sup>(1)(2)</sup>

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

**Northern Ireland** — Technical Booklet H, Section 7. The requirements of Regulation H7 shall only apply to a window installed in a dwelling which opens over a public route of travel.

12.5 Transparent glazing, of which people may be unaware and with which they are likely to collide, shall incorporate features which make it apparent. For ways of complying with the requirements of the Building Regulations see:

**England and Wales** — Approved Document N, section 1 for domestic buildings

**Scotland** — Standard 4.8(b), clause 4.8.2<sup>(1)(2)</sup>

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

**Northern Ireland** — Technical Booklet V, Section 3.

## 13 Ease of operation

The window can be operated without difficulty when correctly installed.

## 14 Maintenance



14.1 For tilt and turn opening lights, the external face of the window can be cleaned from inside the building.

14.2 For windows not covered by section 14.1, reasonable provision shall be made for safe means of access to clean both faces of the window. For ways of complying with the requirements of the Building Regulations see:

**England and Wales** — Approved Document N (requirement does not apply to dwellings)

**Scotland** — Standard 4.8(c), clauses 4.8.3<sup>(1)(2)</sup> and 4.8.4<sup>(1)(2)</sup>

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

**Northern Ireland** — Technical Booklet V, Section 5.

14.3 The PVC-U 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.

14.4 The friction hinges and locking mechanism should be cleaned and lubricated periodically to minimise wear and to ensure smooth operation. Care should be taken to avoid applying lubricant to the sliders as this will impair their braking action. The resistance of the sliders can be adjusted, if necessary, with the brass screw or die-cast, slot-headed cam provided in each slider.



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

14.6 The window can be re-glazed, and the gaskets and weatherstripping replaced. If a co-extruded glazing bead is fitted and the gasket is damaged, for example during re-glazing, it may be necessary to replace the complete bead. These operations should be carried out by specialist operatives using the materials recommended by the Certificate holder and approved by the BBA.

14.7 Care should be taken when using proprietary materials for cleaning the glass, to ensure that deposits are not allowed to remain on the PVC-U 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.

14.8 Paints can adversely affect the impact strength of the PVC-U frame members and the application of dark colours to white profiles could lead to a risk of thermal distortion. Therefore painting is not recommended.

14.9 The mastic seal to the building structure will need to be replaced within the life of the window.

## 15 Durability



15.1 The PVC-U elements will continue to function satisfactorily for a period in excess of 35 years.

15.2 The co-extruded glazing beads, gaskets and fittings, including the hinges, locking mechanism and operating handles, as described in this Certificate, may need to be replaced within the life of the window, particularly when exposed to aggressive environments, such as coastal or industrial locations.

15.3 Any slight colour change or surface dulling that might occur will be uniform over the visible surfaces of the windows.

## Installation

16.1 The window must be fixed into the opening, in accordance with BS 8213-4 : 2007 using proprietary expanding anchors through the frame or galvanized steel fixing lugs.

16.2 Openings in new walls should be formed using a suitable template 10 mm wider and higher than the window to be installed. The window should not be built in at the construction stage.

16.3 The provision of a cavity closer and/or cavity barrier around the window opening, prior to installation, may be required. Details of products covered by an Agrément Certificate can be found on the BBA website.

## Technical Investigations

### 17 Tests

17.1 Tests were carried out on Elite 70 Outward Opening and Tilt and Turn Systems, in accordance with the methods defined in BS 6375-1 : 1989, BS 6375-1 : 2004, BS 6375-2 : 1987, BS 7412 : 2002 and MOAT No 1 : 1974 to determine:

- air permeability
- watertightness
- effect of wind loads
- efficiency of window fittings
- mechanical loading
- ease of operation.

17.2 Tests were carried out in accordance with MOAT No 8 : 1973, MOAT No 17 : 1990 and BS EN 12608 : 2003 on the PVC-U extrusions and profiles.

17.3 The thermal transmittance (U value) of two outward opening windows were measured using the Guarded Hot Box Method.

### 18 Investigations

The profile manufacturing process and the window fabrication procedure including, in each case, the methods adopted for quality control, have been examined and found satisfactory by the BBA.

## Bibliography

BS 952-1 : 1995 *Glass for glazing — Classification*

BS 6206 : 1981 *Specification for impact performance requirements for flat safety glass and safety plastics for use in buildings*

BS 6262-1 : 2005 *Glazing for buildings — General methodology for the selection of glazing*

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

BS 6375-1 : 1989 *Performance of windows — Classification for weathertightness (including guidance on selection and specification)*

BS 6375-1 : 2004 *Performance of windows and doors — Classification of weathertightness and guidance on selection and specification*

BS 6375-2 : 1987 *Performance of windows — Specification for operation and strength characteristics*

BS 7412 : 2002 *Plastics windows made from unplasticized polyvinyl chloride (PVC-U) extruded hollow profiles — Specification*

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 8213-4 : 2007 *Windows, doors and rooflights — Code of practice for the survey and installation of windows and external doorsets*

BS EN 755-2 : 2008 *Aluminium and aluminium alloys — Extruded rod/bar, tube and profiles — Mechanical properties*

BS EN 1279-2 : 2002 *Glass in building — Insulating glass units — Long term test method and requirements for moisture penetration*

BS EN 1279-3 : 2002 *Glass in building — Insulating glass units — Long term test method and requirements for gas leakage rate and for gas concentration tolerances*

BS EN 10088-2 : 2005 *Stainless steels — Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

BS EN 10346 : 2009 *Continuously hot-dip coated steel flat products — Technical delivery conditions*

BS EN ISO 12567-1 : 2000 *Thermal performance of windows and doors — Determination of thermal transmittance by hot box method — Complete windows and doors*

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

BS EN 12608 : 2003 *Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors — Classification, requirements and test methods*

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

BS EN ISO 10077-2 : 2003 *Thermal performance of windows, doors and shutters — Calculation of thermal transmittance — Numerical method for frames*

BS EN ISO 12567-1 : 2000 *Thermal performance of windows and doors — Determination of thermal transmittance by hot box method — Complete windows and doors*

MOAT No 1 : 1974 *Directive for the Assessment of Windows*

MOAT No 8 : 1973 *Directive for Rigid PVC Products Used Externally in Building*

MOAT No 17 : 1990 *UEAtc Technical Guide for the Agrément of windows in PVC-U*

## Conditions of Certification

### 19 Conditions

19.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- 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.

19.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

19.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant 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.

19.4 In granting this Certificate, the BBA is not responsible for:

- 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
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

19.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date 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. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.