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Agrément Certificate
03/4054
Product Sheet 1

MASTERFRAME PVC-U WINDOW SYSTEMS

MASTERFRAME VERTICAL SLIDING PVC-U WINDOW SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to the Masterframe Vertical Sliding PVC-U Window System in white and white woodgrain finish, with or without surface-attached bars, for use in walls of domestic and non-domestic buildings for replacement and new-build applications.

(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 properties — the thermal transmittance (U value) of a vertical sliding window was simulated as $1.5 \text{ W}\cdot\text{m}^{-2} \cdot\text{K}^{-1}$ according to BS EN ISO 10077-1 : 2006 and BS EN ISO 10077-2 : 2012 (see section 6).

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

Ventilation — opening lights can provide rapid ventilation (see section 8).

Basic security against intrusion — the windows meet the basic requirements of NHBC (see section 9).

Durability — the PVC-U extruded profiles will continue to function satisfactorily for a period in excess of 35 years (see section 16).



The BBA has awarded this Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

A handwritten signature in black ink, appearing to read 'John Albon'.

Date of Second issue: 17 March 2014

John Albon — Head of Approvals
Energy and Ventilation

A handwritten signature in black ink, appearing to read 'Claire Curtis-Thomas'.

Claire Curtis-Thomas
Chief Executive

Originally certificated on 19 December 2003

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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In the opinion of the BBA, the Masterframe Vertical Sliding PVC-U Window System, if installed, used and maintained in accordance with the provisions of 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 regions of the UK depicted):



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

Requirement:	B1	Means of warning and escape
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 11.1 and 11.2 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The system has adequate resistance to the ingress of rain and wind-driven spray and so can contribute towards the wall satisfying this Requirement. See Table 4 (section 7) of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The system will not constitute a significant condensation risk and so can contribute towards the wall satisfying this Requirement. See section 12.1 of this Certificate.
Requirement:	F1(1)	Means of ventilation
Comment:		In assessing the contribution of the system to natural purge ventilation, the area of opening should be calculated in accordance with section 8.1 in this Certificate and related to floor area as set out in Approved Document F.
Requirement:	K	Protection from falling, collision and impact
Requirement:	K5.3	Safe opening and closing of windows etc (applicable to England only)
Comment:		In buildings other than dwellings, this Requirement can be met. See sections 13.3 to 13.5 of this Certificate.
Requirement:	K5.4	Safe access for cleaning windows etc (applicable to England only)
Comment:		In buildings other than dwellings, this Requirement can be met. See section 13.1 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The system can contribute to meeting this Requirement. See section 6 of this Certificate.
Requirement:	N3	Safe opening and closing of windows, skylights and ventilators (applicable to Wales only)
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 13.3 to 13.5 of this Certificate.
Requirement:	N4	Safe access for cleaning windows etc (applicable to Wales only)
Comment:		In buildings other than dwellings, this Requirement can be met when opening lights can be safely cleaned from inside the building. See section 13.1 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The system is acceptable. See sections 16.1 and 16.2 and the <i>Installation</i> part of this Certificate.
Regulation:	26	CO₂ emission rates for new buildings
Comment:		The system can 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 system satisfies this Regulation. See sections 15.1, 15.2, 16.1 and 16.2 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building Standards applicable to construction
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. See sections 11.1 and 11.2 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The system has 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 ⁽¹⁾⁽²⁾ . See Table 4 (section 7) of this Certificate.
Standard:	3.14	Ventilation
Comment:		In calculating the contribution of the system to natural ventilation, with reference to clauses 3.14.2 ⁽¹⁾⁽²⁾ and 3.14.3 ⁽¹⁾ of this Standard, the area of opening can be calculated in accordance with section 8.1 of this Certificate.
Standard:	3.15	Condensation
Comment:		The system will not constitute a significant condensation risk and so can contribute towards the wall satisfying this Standard, with reference to clauses 3.15.1 ⁽¹⁾ and 3.15.4 ⁽¹⁾ . See section 12.1 of this Certificate.
Standard:	3.16	Natural lighting
Comment:		In calculating the contribution of the system to natural lighting, with reference to clause 3.16.1 ⁽¹⁾ and 3.16.3 ⁽¹⁾ of this Standard, the area of glazing can be calculated in accordance with section 10 of this Certificate.

Standard:	4.8(c)	Danger from accidents
Comment:		Opening lights that can be safely cleaned from inside the building can satisfy this Standard, with reference to clause 4.8.3 ⁽¹⁾⁽²⁾ . See sections 13.1 and 13.2 of this Certificate.
Standard:	4.8(e)	Danger from accidents
Comment:		Opening lights that can be opened, closed and adjusted safely satisfy this Standard, with reference to clause 4.8.5 ⁽¹⁾⁽²⁾ . See sections 13.3 to 13.5 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		In satisfying these Standards, with reference to clauses 6.1.1 ⁽¹⁾ , 6.1.2 ⁽¹⁾ , 6.1.4 ⁽²⁾ , 6.1.6 ⁽¹⁾ , 6.1.7 ⁽¹⁾ , 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.4 ⁽²⁾ , 6.2.6 ⁽¹⁾ , 6.2.7 ⁽¹⁾ , 6.2.8 ⁽²⁾ , 6.2.9 ⁽¹⁾⁽²⁾ , 6.2.11 ⁽¹⁾⁽²⁾ and 6.2.13 ⁽¹⁾⁽²⁾ , see section 6 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The system 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 system 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 – conversions
Comment:		All comments given for these systems 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(a)(b)	Fitness of materials and workmanship
Comment:		The system is acceptable. See sections 16.1 and 16.2 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system has adequate resistance to the ingress of rain and wind-driven spray and so can contribute towards the wall satisfying this Regulation. See Table 4 (section 7) of this Certificate.
Regulation:	33(c)	Means of escape
Comment:		Windows of an appropriate size can be used as an escape route in dwellings. See sections 11.1 and 11.2 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide Emissions Rate
Comment:		The system can contribute to satisfying these Regulations. See section 6 of this Certificate.
Regulation:	65(1)	Means of ventilation
Comment:		Details for calculating the area of window openings for ventilation purposes are given in section 8.1 of this Certificate.
Regulation:	98	Safe opening and closing of windows, skylights and ventilators
Comment:		The requirements of this Regulation shall be deemed to be satisfied if the window complies with the requirements of Technical Booklet V, Section 4. See sections 13.3 to 13.5 of this Certificate.
Regulation:	99	Safe means of access for cleaning glazing
Comment:		Opening lights that can be safely cleaned from inside the building can satisfy this Regulation. See section 13.1 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* (3.3 and 3.4) of this Certificate.

Non-regulatory Information

NHBC Standards 2014

NHBC accepts the use of the Masterframe Vertical Sliding PVC-U Window System, when installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards, Chapter 6.7 Doors, windows and glazing*.

Technical Specification

1 Description

1.1 The Masterframe Vertical Sliding PVC-U Window System comprises a combination of two vertical sliding or fixed sashes, with or without surface-attached bars, within a frame or multiple frames. They are coupled together with a single sill, all in white or woodgrain (white) finish PVC-U and glazed internally with sealed, double-glazed units⁽¹⁾.

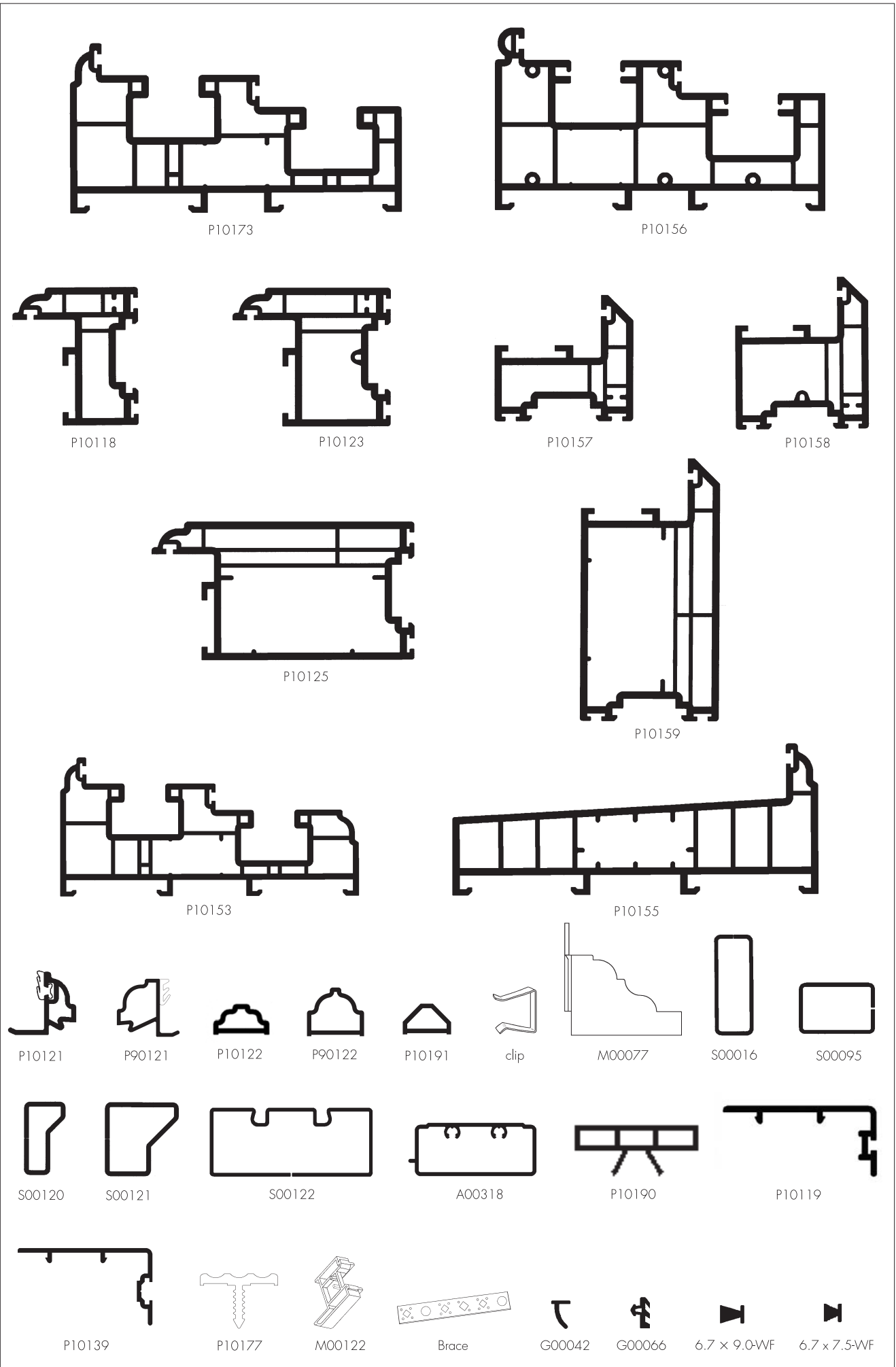
(1) Outside the scope of this Certificate.

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 (see Table 1 and Figure 1). Woodgrain profiles are surface covered with PVC which incorporates a clear acrylic protective lacquer. Profiles are available with the foil applied to both visible faces of the white PVC-U substrate.

Table 1 Profiles

Manufacturer's designation	Profile type	Application
P10173	L-section	outer frame (133 mm)
P10153	L-section	outer frame (146.5 mm)
P10156	L-section	outer frame (133 mm)
P10118	L-section	small sash (50 mm, ovolo)
P10123	L-section	large sash (63 mm, ovolo)
P10157	L-section	small sash (50 mm, chamfered)
P10158	L-section	large sash (63 mm, chamfered)
P10125	L-section	deep bottom rail (105 mm, ovolo)
P10159	L-section	deep bottom rail (105 mm, chamfered)
P10155	–	sill
P10121	–	ovolo bead (24 mm) black PCE gasket
P90121	–	bead (18 mm) black PCE gasket
P10122	–	surface-attached bar (ovolo, 24 mm glazing unit)
P10191	–	surface-attached bar (chamfered, 24 mm glazing unit)
P90122	–	surface-attached bar (ovolo, 18 mm glazing unit)
–	–	Georgi clip
M00077	–	horn
S00016	–	steel reinforcement (P10153)
S00095	–	steel reinforcement (P10156)
S00120	–	steel reinforcement (P10118, P10157)
S00121	–	steel reinforcement (P10123, P10158)
S00122	–	steel reinforcement (P10125)
A00318	–	aluminium reinforcement (P10159)
P10119	–	interlock
P10139	–	interlock
P10190	–	channel cover
P10177	–	coupling
M00122	–	end cap
–	–	brace
G00042	–	bottom seal
G00066	–	external glazing gasket
6.7 x 9.0-WF	–	brush seal (outer frame)
6.7 x 7.5-WF	–	brush seal (sash)
HT67 P	–	double-sided tape

Figure 1 Profiles (all dimensions in mm)



1.3 The Certificate holder should adhere to the methods of selection, machining and assembly of frame components as detailed in the *Masterframe Technical Manual*.

1.4 The outer frame has three welded sides and a mechanically-jointed sill. The top member of outer frame P10156 can be butt jointed to the jambs using glue and screws and mechanically jointed to the sill (P10155). The lower sashes may be fully welded or may have three welded sides or three butt jointed sides and a mechanically-jointed deep bottom rail. Upper sashes may be fully welded, have three welded sides or three butt jointed sides and a mechanically-jointed bottom sash member, with continuous horns milled in the jamb profiles. As an option, bars extruded from PVC-U can be attached on one or both sides of the double-glazed unit⁽¹⁾ by means of double-sided adhesive tape and Georgi⁽²⁾ clips. A lattice of cross bars is also positioned inside the double-glazed unit⁽¹⁾.

(1) Outside the scope of this Certificate.

(2) Registered trademark of Masterframe Windows Ltd.

1.5 Individual frames may be coupled together to form multilight windows in accordance with the *Masterframe Technical Manual*. Fixed windows are manufactured in the same way as opening ones, but the sashes are screwed shut to the outer frame.

1.6 The system is fabricated using conventional production processes for PVC-U windows.

1.7 Where the mechanically jointed deep bottom rail is used, the jambs of the lower sash are screwed through to ported aluminium reinforcement inserted in the deep bottom rail. Where the bottom member of the upper sash is mechanically jointed, it is milled to fit the sash profile, drilled at either end to allow the fitting of a cross dowel (M6 x 20 mm for the slim profile and M6 x 30 mm for the large profile) and the vertical members are screwed into the cross dowel (M6 x 60 mm screws) in accordance with the *Masterframe Technical Manual*.

1.8 Where the top member of the outer frame is butt jointed, it is milled to fit the jamb profiles, glued and screwed to the jambs (3.9 x 16 mm screws). Where the top member of the upper or the lower sash is butt jointed, it is milled to fit the jamb profiles and screwed to the jambs through a stainless steel bracket (3.9 x 19 mm screws) in accordance with the *Masterframe Technical Manual*. End caps are fitted to the bottom of the sash jambs. The sash is glazed attaching the clips. The surface-attached bars are milled to form a lattice and attached to the sash by engaging in the clips and by means of the double-sided tape. The sill is mechanically jointed to the jambs of the ported outer frame using round-head screws (zinc passivated, 5 mm x 50 mm) and the appropriate template.

1.9 Where windows are coupled together, the frames are laid side by side and the coupling nuts inserted in alternating channels of the frame, minimum 150 mm and maximum 250 mm from the top and the bottom of the frame and then at 600 mm centres. The next frame is pushed against the first, so that the coupling nuts engage into the channels and the nuts are rotated to lock the frames together. The sill is then screwed to the bottom of the frame using the method described above. A coupling trim (P01077) is used between the frames in accordance with the *Masterframe Technical Manual*, and the joint at the top of the frames is sealed with silicone sealant.

1.10 The window is completed by fixing the sashes to the balances, locating the weatherstrips and brush seals and securing the furniture in position with screws.

1.11 Drainage is provided by a series of slots, 5 mm by 30 mm, and holes, 5 mm diameter, positioned in accordance with the *Masterframe Technical Manual*. In general, on multilight units each element is treated as a separate window and drainage slots cut accordingly, to retain symmetry where possible.

Reinforcement

1.12 Outer frame members are reinforced with galvanized mild steel where the height exceeds 1400 mm, in accordance with the *Masterframe Technical Manual*.

1.13 Sashes are always reinforced with galvanized mild steel in accordance with the *Masterframe Technical Manual*. The deep bottom rail member of the lower sash is reinforced with aluminium reinforcement.

1.14 Sills are not normally reinforced in accordance with the *Masterframe Technical Manual*.

1.15 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

1.16 This Certificate relates to Masterframe individual frames, comprising two vertical sliding or fixed sashes or multilights incorporating combinations of individual frames coupled together on a single sill within the limitations shown in Table 2.

<i>Table 2 Size restriction</i>	
	Dimension (mm)
<i>All windows</i>	
Maximum overall width of any outer frame	1000
Maximum overall width of coupled frames	2200
Maximum height of any outer frame	2000
<i>Sashes</i>	
Maximum size of individual sash	900 wide x 1000 high

Fittings

1.17 Opening windows included in this Certificate are fitted with various forms of sash balances. The balances are pre-tensioned to suit the size and weight of the sash and are fixed to the frame with screws.

1.18 The sashes are fastened by means of locking catches. The catches are available, as an option, with a key locking facility. The catches and keeps with various finishes are formed from materials assessed and approved by the BBA. The catches and the keeps are fixed by means of self tapping screws which penetrate a thickened area of the profile wall or the reinforcing. Handles with various finishes, formed from materials assessed and approved by the BBA, are fitted to upper and lower sashes. In addition, the sashes are fitted with a tilt mechanism for cleaning purposes.

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

Glazing

1.20 Windows without surface-attached bars are supplied factory glazed or ready for glazing and windows with surface-attached bars are supplied factory glazed, 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.

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

Weatherstripping and gaskets

1.22 A silicone compression seal is located in the groove at the bottom of the lower sash frame where it closes against the sill. Brush seals, made from polypropylene wool pile, are located around the periphery of the sash and on the internal sill upstand.

1.23 Gaskets formed from TPE material are fitted between the frame and the double-glazed unit. The unit is secured by post calibration co-extruded bead.

2 Manufacture

2.1 The windows are fabricated from white unplasticised polyvinyl chloride (PVC-U) profiles, produced by conventional extrusion techniques from material complying with BS EN 12608 : 2003. See also sections 1.3 to 1.23.

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 system of Masterframe Windows Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 and BS EN ISO 14001 : 2004 by United Registrar of Systems (Certificates 043-A and 00917/A/0001/UK/En).

3 Delivery and site handling

3.1 Windows without surface-attached bars are delivered to site glazed or ready for glazing and windows with surface-attached bars are supplied factory glazed. For transportation they are suitably protected to avoid damage. Particular care is needed to avoid damaging woodgrain finishes, as it may be impossible to restore the appearance.

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

3.3 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.

3.4 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.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Masterframe Vertical Sliding PVC-U Window System.

4 Use

The Masterframe Vertical Sliding PVC-U Window System is satisfactory for use where windows are installed vertically into the external walls of domestic and non-domestic buildings for replacement and new build applications.

5 Practicability of installation

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

6 Thermal properties



6.1 The following Masterframe vertical sliding window, 1230 mm wide by 1480 mm high, incorporating:

- two vertical sliding sashes
- P10156 outer frame (reinforced with S00095, jambs only)
- P10118 upper sash (reinforced with S00120)
- P10123 lower sash (reinforced with S00121)
- P10159 deep bottom rail (reinforced with S00122)
- P10155 sill (reinforced with S00016)
- P10119 interlock
- P10121 glazing bead
- 4/16/4 mm sealed double-glazed unit
 - 16 mm argon-filled cavity (90%)
 - external pane: 4 mm float glass
 - internal pane: 4 mm float glass, ($\epsilon = 0.05$)
 - spacer: Swisspacer V

achieves a U value (U_w) of $1.5 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ when assessed to BS EN ISO 10077-1 : 2006 and BS EN ISO 10077-2 : 2012.

6.2 The U values of the window described in section 6.1 fitted with glazing bars were calculated in accordance with BS EN 14351-1 : 2006, Appendix J (see Table 3).

Table 3 Thermal transmittance of windows fitted with glazing bars

Window type	Thermal transmittance U value ($\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$)
Window with bar(s) attached on both outer faces of the glazing unit	1.5
Window fitted with single cross bar in the glazing unit with or without attached bars	1.6
Window with multiple cross bars in the glazing unit with or without multiple attached bars	1.7
Window with Georgian bar ⁽¹⁾	1.9

(1) Outside the scope of this Certificate.

6.3 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 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 12567-1 : 2010, or calculation to BS EN ISO 10077-1 : 2006 and BS EN ISO 10077-2 : 2012 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).

6.4 Design window thermal performances are detailed in the documents supporting the national Building Regulations.

7 Weathertightness

7.1 Selected samples from the system were tested generally in accordance with BS EN 1026 : 2000, BS EN 1027 : 2000 and BS EN 12211 : 2000 and are suitable for use as indicated in Table 4. The classifications are based on the assumption that the outer frame is supported on all four sides in accordance with the manufacturer's instructions.

7.2 Selected samples from the system were tested generally in accordance with BS EN 1026 : 2000, BS EN 1027 : 2000 and BS EN 12211 : 2000. The results show that the products, within the range described in section 1.1,


are suitable for use where the test pressure classes defined in BS EN 12207 : 2000, BS EN 12208 : 2000 and BS EN 12210 : 2000 and indicated in Table 4 are applicable. The classifications are based on the assumption that the outer frame is supported on all four sides in accordance with the manufacturer's instructions.

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

Table 4 Weathertightness classifications

	Resistance to wind load BS EN 12210 : 2000	Watertightness BS EN 12208 : 2000	Air permeability BS EN 12207 : 2000
All windows up to maximum size and coupled frames up to maximum size	Class A5 (2000 Pa)	Class 5A (max test pressure 200 Pa)	Class 3 (max test pressure 600 Pa)

8 Ventilation

 8.1 The opening area for natural ventilation may be calculated by multiplying together the overall width of the openable windows minus twice the width of the outer frame by the transom drop (from top of rebate to the middle of the bottom member of the upper sash) minus 202 mm. Only one sash can be fully opened at a time, therefore the maximum opening area must be calculated accordingly.

8.2 The background ventilation requirements of the various building regulations can be met by the incorporation in the window of a suitably-sized trickle ventilator⁽¹⁾. The ventilator may be glazed in, fitted in a supplementary head member.


(1) Outside the scope of this Certificate.

9 Basic security against intrusion


9.1 Masterframe vertical sliding sashes are fitted with a lock mechanism as described in section 1.18 of this Certificate. When fastened in the closed position the sash 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 2014 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.

9.2 The design of the glazing is such that the removal of the glazing from the outside is extremely difficult, as all beads are fitted internally.

10 Glass area

 The approximate unobstructed glass area of the windows is determined by deducting from the overall width and height the appropriate profile dimensions.

11 Unobstructed opening area

 11.1 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 m² and not less than 450 mm high by 450 mm wide, which may be at an angle or straight through.

11.2 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⁽¹⁾ as escape windows

(1) Technical Booklet (Domestic).

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

12 Condensation risk

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

12.2 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.

13 Safety



13.1 For opening lights fitted with a tilt mechanism, the external face of the window can be cleaned from inside the building.



13.2 For windows not covered by section 13.1, reasonable provision shall be made for safe means of access to clean both faces of the window. Ways of complying with the requirements of the Building Regulations are described in:

England — Approved Document K5.4 (for buildings other than dwellings)

Wales — Approved Document N4 (for buildings other than dwellings)

Scotland — Standard 4.8(c), clauses 4.8.3⁽¹⁾⁽²⁾ and 4.8.4⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet V, Section 5.



13.3 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.

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

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

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

13.6 Reasonable provision shall be made to minimise the risk of people colliding with an open window when moving in or about a building. Ways of complying with the requirements of the Building Regulations are described in:

England — Approved Document K5.1 (for buildings other than dwellings)

Wales — Approved Document N (for buildings other than dwellings)

Scotland — Standard 4.8(a), clause 4.8.1⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet H, Section 8. The requirements of Regulation 60 shall only apply to a window installed in a dwelling which opens over a public route of travel.

13.7 Transparent glazing, of which people may be unaware and with which they are likely to collide, shall incorporate features which make it apparent. Ways of complying with the requirements of the Building Regulations are described in:

England — Approved Document K5.2 for buildings other than dwellings

Scotland — Standard 4.8(b), clause 4.8.2⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet V, Section 4.

14 Ease of operation

The window can be operated without difficulty when correctly installed.

15 Maintenance



15.1 The window can be re-glazed, the surface-attached bars can be replaced by re-glazing the sash and the gaskets and weatherstripping replaced. These operations should be carried out by specialist operatives using the materials recommended by the Certificate holder and approved by the BBA. If a post calibration 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. This will depend on whether the bead is designed to accept conventional gaskets as an alternative. The use of conventional gaskets with this vertical sliding window system is outside the scope of this Certificate.

15.2 Should damage occur, the furniture and fittings can be replaced.

15.3 The sash balances, tilt mechanisms and locking catches should be cleaned and lubricated periodically to minimise wear and to ensure smooth operation.

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

15.5 The PVC-U frame members can be cleaned using detergent soft sponge and soapy water. Solvent-based, corrosive or abrasive cleaners should not be used, particularly on woodgrain finishes as the loss of the acrylic lacquer will have a serious effect on durability. If dirt is allowed to build up on the members over long periods it may become more difficult to restore the surface appearance.

15.6 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.

15.7 Paint 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 paint should not be applied. Repair of the woodgrain foil is outside the scope of this Certificate.

16 Durability



16.1 The PVC-U extruded profiles will continue to function satisfactorily for a period in excess of 35 years. The surface-attached bars will have a life consistent with that of the sealed double-glazed units, estimated to be 10 years.

16.2 The co-extruded glazing beads, gaskets and fittings, including the sash balances, tilt mechanism, locking catches and 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.

16.3 Any slight colour change or surface dulling that might occur will be uniform over the visible surfaces of the windows for the white and woodgrain (white) finish, assuming in the latter case that the acrylic lacquer is undamaged.

17 Reuse and recyclability

The PVC-U profiles of the system can be recycled.

Installation

18 General

18.1 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.

18.2 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.

18.3 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 (www.bbacerts.co.uk).

Technical Investigations

19 Tests

19.1 Tests⁽¹⁾ were carried out to determine:

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

(1) Test reports are held by the Certificate holder.

19.2 Tests were carried out in accordance with BS EN 12608 : 2003 and BS 7722 : 2002 on the PVC-U extrusions.

19.3 Tests were carried out on various items of hardware in accordance with BS EN 1670 : 2007 to assess resistance to salt spray corrosion.

20 Investigations

20.1 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.

20.2 Simulations of the window system were carried out in accordance with BS EN ISO 10077-1 : 2006 and BS EN ISO 10077-2 : 2012.

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 7722 : 2002 *Surface covered PVC-U profiles for windows and doors — 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 1026 : 2000 *Windows and doors — Air permeability — Test method*
- BS EN 1027 : 2000 *Windows and doors — Watertightness — Test method*
- 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 1670 : 2007 *Building hardware — Corrosion resistance — Requirements and test methods*
- BS EN 10346 : 2009 *Continuously hot-dip coated steel flat products — Technical delivery conditions*
- 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 12211 : 2000 *Windows and doors — Resistance to wind load — Test method*
- 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 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 9001 : 2008 *Quality management systems — Requirements*
- BS EN ISO 14001 : 2004 *Environmental Management systems — Requirements with guidance for use*
- BS EN ISO 10077-1 : 2006 *Thermal performance of windows, doors and shutters — Calculation of thermal transmittance — General*
- BS EN ISO 10077-2 : 2012 *Thermal performance of windows, doors and shutters — Calculation of thermal transmittance — Numerical method for frames*
- BS EN ISO 12567-1 : 2010 *Thermal performance of windows and doors — Determination of thermal transmittance by the hot box method — Complete windows and doors*
- BRE Report (BR 262 : 2002) *Thermal insulation : avoiding risks*

21 Conditions

21.1 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.

21.2 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.

21.3 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.

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

21.5 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.

21.6 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.