

Specification for enhanced security performance of windows for domestic applications

ICS 91.060.50

Committees responsible for this British Standard

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Association of Builders' Hardware Manufacturers
British Plastics Federation
British Wood Preserving and Damp-proofing Association
British Woodworking Federation
Centre for Window and Cladding Technology
Construction Fixings Association
Consumer Policy Committee of BSI
Council for Aluminium in Building
Department of the Environment (Building Research Establishment)
Flat Glass Manufacturers' Association
Glass and Glazing Federation
Guild of Architectural Ironmongers
Health and Safety Executive
LHC Building Components and Services
National House Building Council
Royal Institute of British Architects
Society of Chief Architects of Local Authorities
Society of Surveying Technicians
Steel Window Association
Timber Research and Development Association

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Amendments issued since publication

Amd. No.	Date	Comments
14289	30 July 2003	Addition of 3.12 and revision of Annex A
15666	18 November 2005	Removal of limitation to casement and tilt/turn windows only, addition of top swing windows to Annex A drawings and Annex B table
16982	28 February 2007	To address issues relating to vertical sliding windows

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Foreword

This British Standard has been prepared under the direction of Subcommittee B/538/1. It supersedes PAS 011:1994, which is withdrawn.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 27 and a back cover.

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Introduction

The concept of “enhanced security” in this specification is based upon a relationship between resistance to forced entry by human intervention techniques as used by an opportunist intruder and resistance to entry under mechanical loading. This relationship has been identified following an extensive test programme conducted on a range of windows. It is acknowledged that in some cases the assessment of the enhanced security characteristics of windows by predetermined mechanical loading alone may not give a suitable assessment of its resistance to human attack. To avoid this situation the loading test is supplemented with manipulation testing which it is considered cannot be replicated mechanically.

It is intended that this should be an evolving specification reflecting current design requirements and intrusion techniques. Accordingly, it will be subject to review and amendment as necessary.

This specification deals with the enhanced security performance of casement, top swing, vertical sliding and tilt/turn windows for domestic applications. In most cases other characteristics will also require consideration, for example, safety, means of escape, weathertightness and mechanical performance.

1 Scope

This British Standard specifies test methods and acceptance criteria applicable to domestic casement, top swing, vertical sliding and tilt/turn windows which provide enhanced security against unauthorized forced entry. It does not purport to provide a means of assessing total security against unauthorized entry.

It is applicable to new windows as manufactured and prior to installation.

It is applicable to windows of any material or combination of materials including any hardware covering single and multilight configurations. The ability to gain entry by the breaking of glazing or infill panels is not assessed in this specification. Guidance should be sought into the security of glazing.

It is applicable to windows with key unlocking hardware. It is also applicable to windows with other than key unlocking hardware when fitted with laminated glass.

For the purpose of this standard restrictors are not considered as part of the locking system; such devices are rendered inoperative prior to test.

This standard is only applicable to a complete window assembly or range of windows with a specific range of components.

It applies to the following window types:

- a) casement: side hung (open-out and open-in), top hung (open-out), bottom hung (open-in);
- b) tilt/turn and turn/tilt;
- c) fixed light and dummy vent;
- d) top swing;
- e) vertical sliding.

Compliance with this standard cannot be claimed in respect of individual component parts.

2 Normative references

This British Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on the inside back cover. For dated references, only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this British Standard only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

3 Definitions

For the purposes of this British Standard, the following definitions apply.

3.1 component failure

3.1.1

primary component failure

a perpendicular-to-plane deflection of 50 mm or greater

NOTE Applicable to a loading point that coincides with a hardware point.

3.1.2

secondary component failure

a perpendicular-to-plane deflection of 50 mm or greater followed by an increase in perpendicular-to-plane deflection with no further increase in applied perpendicular-to-plane load

NOTE Applicable to a loading point that has previously exhibited primary component failure or to a loading point that does not coincide with a hardware point.

3.2 entry

3.2.1 for windows with key unlocking hardware on all opening lights. The creation of an aperture through which a 500 mm long cylindroid with an elliptical section of 225 mm minor and 380 mm major diameters can pass freely

NOTE This simulates the passage of an intruder's body.

3.2.2 for windows with other than key unlocking hardware on any opening light. The creation of an aperture through which a 500 mm long cylinder of 25 mm diameter can pass freely, or an existing aperture through which this body can pass

NOTE This simulates the passage of a tool to release the locking mechanism.

3.3

glazing

the glass or infill medium

3.4

key unlocking hardware

hardware that requires a removable key to effect the unlocking function

NOTE The locking function may be effected with or without the key.

3.5

opening corners

free corners opposite the hinge side

3.6

opening face

leading face of a vent when opened, i.e. the exterior face of an open-out vent and the interior face of an open-in vent

3.7

plane

plane of the glazing

3.8

vent

moveable individual glazed unit of a window

3.9

dummy vent

vent which is permanently fixed in the closed position

3.10

fixed light

glazing that is permanently retained within the outer framing members of the window

3.11**range**

group of windows with defined limits of size, type, configuration, hardware, glazing, construction and security features

3.12**technique**

combination of tools and location

NOTE Any change in either the tools or the location constitutes a new technique.

4 Sample selection

Two identical windows shall be selected, one for manual and one for mechanical testing. Sample pairs shall be selected by the test authority and agreed with the supplier/manufacture. Where a range of windows is to be considered the number and type of samples chosen shall be representative of the product range which the manufacturer/supplier wishes to have assessed. The samples selected shall include the most adverse and vulnerable aspects of the design, size and configuration.

The following list, which is not exhaustive, identifies some of the features that may influence the security of the window:

- a) maximum distance between points which secure the vent to the outer frame (including dummy vents);
- b) glazing methods to cover internal, external and channel glazing systems, types of glazing beads, gaskets, security clips, tapes and glazing blocks;
- c) single and/or double glazing, including thickness;
- d) reinforcements used in any system;
- e) hardware: locking and hinge options, fixings and changes with respect to vent size.

For the purpose of these tests only, all glass supplied in samples shall be toughened to meet class A of BS 6206.

5 Testing**5.1 Test methods**

The methods of test shall be as specified in Annex A.

5.2 Assessment

Assessment follows the steps summarized as a flow chart shown in Figure 1.

5.3 Test report

The test report shall include at least the following information.

- a) A concise description of the window including at least the following information, checked before the test:
 - 1) manufacturer's name and specific product identification;
 - 2) types of opening lights;
 - 3) materials and, if applicable, their surface treatment;
 - 4) overall width and overall height;
 - 5) method of frame jointing;
 - 6) framing, profile and reinforcement details where applicable;
 - 7) types of beading, gaskets, methods of glazing and any security feature present in the glazing rebate;
 - 8) type and thickness of glass and overall thickness of glazing unit;
 - 9) types and details of hardware;

- 10) types and details of hardware fixings;
- 11) a detailed drawing(s) of the window elevation viewed from the outside, including the positions of the hardware.
- b) The definition of the window range (see 3.11) applicable to the report including size limitation and window configuration.
- c) The results obtained during each test.
- d) Diagram of the test apparatus or its reference.
- e) Laboratory ambient air temperature at the time of test.
- f) Testing organization, date of test, test engineer and any witnesses.
- g) A statement that the results are valid only for the conditions under which the test was conducted and for the specific window range (see 3.11).
- h) A summary of the result and assessment for the range.

6 Apparatus

The test apparatus shall support the sample rigidly. The test frame or additional support shall not overlap the sample frame by more than 10 mm. For both mechanical and manual tests the sample shall be installed vertically in the test apparatus and secured to prevent movement. A suitable test arrangement is shown in Figure 2.

When conducting the manual test the apparatus shall allow for free unrestricted access to the exterior face of the window with the sample mounted at a height of $800\text{ mm} \pm 100\text{ mm}$ from the working floor level to the underside of the sill or sub sill. The outer frame of the window shall be fitted flush with the outer frame of the test apparatus (see Figure 3).

When carrying out the mechanical test, the test apparatus shall be provided with the means of applying and maintaining the loads parallel and perpendicular to the plane of the test sample to within a measured accuracy of $\pm 2\%$. Perpendicular-to-plane loads shall be controlled to an accuracy of $\pm 5\%$. In the case of vertical sliding windows parallel-to-plane loads applied in the direction of normal opening shall also be controlled to an accuracy of $\pm 5\%$. Other parallel-to-plane loads shall be controlled to an accuracy of $+2\%$ to -10% . Typical loading configurations are shown in Figure 4, Figure 5, Figure 6 and Figure 7. A suitable bracket as shown in Figure 8 shall be used to apply the loads.

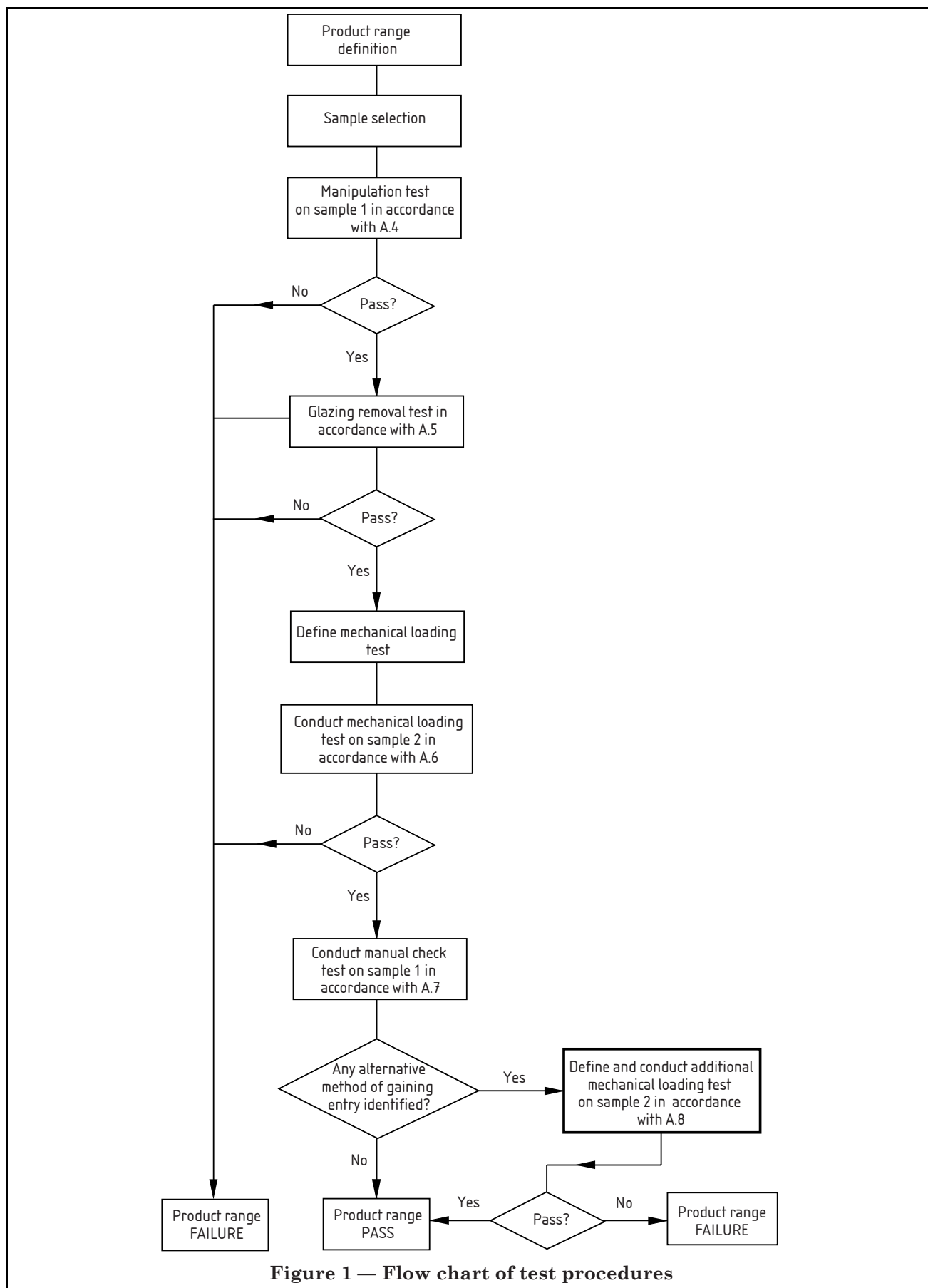
The apparatus shall provide frame support to prevent perpendicular-to-plane movement of the sample's outer frame with respect to the timber subframe. The supported area shall be a minimum of 200 mm in length and $7.5\text{ mm} \pm 2.5\text{ mm}$ wide measured from the outer edge of the profile as shown in Figure 9. In addition the apparatus shall provide frame support to prevent parallel-to-plane movement of the timber subframe.

The apparatus shall also provide support to prevent movement of transoms and mullions when the perpendicular-to-plane load is applied to locking points adjacent to the transom or mullion. The supported area shall be sufficient to prevent significant indentation of the frame material. Typical mullion and transom support is shown in Figure 10.

The perpendicular-to-plane load shall be normally applied via a loading pad with a nominal area of $1\,000\text{ mm}^2$ with a minor dimension of not less than 25 mm (see Figure 11). Where this size of loading pad is impracticable, a pad with a minor dimension of not less than 15 mm and a nominal area of $1\,000\text{ mm}^2$ may be used. In all cases the line of action of the applied load shall be applied to the geometric centre of the loading pad. When hardware is mounted on the face of the vent in a position to prevent the use of the loading pad within the radial tolerance then a loading bridge may be used. This bridge shall apply the load simultaneously at two points to the vent with the force line as close as possible to the contact area of the locking point within a radial tolerance of 50 mm. The two loading points of the bridge shall be equally spaced about the force line with a maximum span of 200 mm. A suitable bridge is shown in Figure 12. The method of attaching the loading pad(s) shall not detrimentally affect the sample under test.

7 Performance requirements

When tested in accordance with Annex A, it shall not be possible to gain entry under the conditions of A.4, A.5, A.6 and A.8.



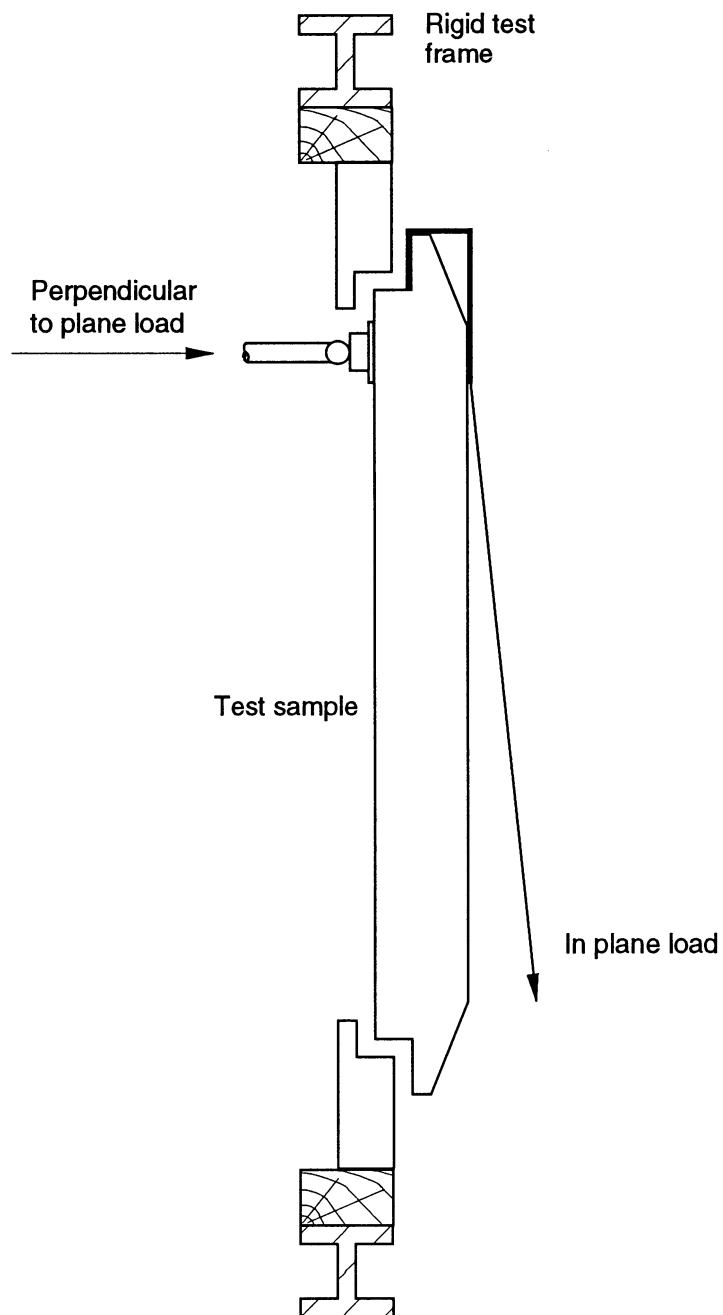


Figure 2 — Typical test arrangement