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PRODUCT ASSESSMENT SPECIFICATION

General performance requirements for door assemblies –

Part 1: Single leaf, external door assemblies to dwellings

ICS 91.060.50



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Foreword

This Product Assessment Specification, PAS 23-1, has been produced by BSI to provide a method for testing and assessing the general performance requirements of single leaf, external door assemblies to dwellings.

This Product Assessment Specification is not to be regarded as a British Standard. It will be withdrawn upon publication of its content in, or as, a British Standard.

Acknowledgement is given to the following organizations who were consulted in the development of this specification:

Association of Builders Hardware Manufacturers;
British Plastics Federation;
British Woodworking Federation;
Council for Aluminium in Building;
Glass and Glazing Federation;
Guild of Architectural Ironmongers;
Steel Window Association.

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Annexes A, B, C and D are normative.

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 25 and a back cover.

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1 Scope

This Product Assessment Specification specifies test methods and acceptance criteria relevant to the general performance of single leaf, single swing, external door assemblies to dwellings, inward or outward opening, with or without integral or coupled side panels and fanlights. The general performance requirements in this specification are applicable to all materials.

NOTE Material-specific requirements are given in annexes A, B, C and D.

This Product Assessment Specification is applicable to new door assemblies as manufactured and prior to installation. It is only applicable to complete door assemblies or a range of door assemblies.

This PAS is not a test of component performance or installation requirements.

This PAS excludes double leaf doors, double swing doors, sliding doors, sliding folding doors, tilt and slide doors, and pivoted doors. It does not cover door assemblies where any frame member is longer than 3 m.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this Product Assessment Specification. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 1474, *Specification for wrought aluminium and aluminium alloys for general engineering purposes: bars, extruded round tubes and sections.*

BS 3900-F2, *Methods of test for paint — Durability tests on paint films — Determination of resistance to humidity (cyclic condensation).*

BS 4787-1, *Internal and external wood doorsets, door leaves and frames — Part 1: Specification for dimensional requirements.*

BS 4873:1986, *Specification for aluminium alloy windows.*

BS 5368-1, *Methods of testing windows — Part 1: Air permeability test.*

BS 5368-2:1980, *Methods of testing windows — Part 2: Watertightness test under static pressure.*

BS 5368-3:1978, *Methods of testing windows — Part 3: Wind resistance tests.*

BS 6262, *Code of practice for glazing for buildings.*

BS 6262-4, *Glazing for buildings — Part 4: Safety related to human impact.*

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

BS 6496, *Specification for powder organic coatings for application and stoving to aluminium alloy extrusions, sheet and preformed sections for external architectural purposes, and for the finish on aluminium alloy extrusions, sheet and preformed sections coated with powder organic coatings.*

BS 7412:1991, *Specification for plastics windows made from PVC-U extruded hollow profiles.*

BS EN 204:1991, *Classification of non-structural adhesives for joining of wood and derived timber products.*

BS EN 300, *Oriented strand boards (OSB) — Definitions, classification and specifications.*

BS EN 312 (all parts), *Particleboards — Specifications.*

BS EN 350 (all parts), *Durability of wood and wood-based products — Natural durability of solid wood.*

BS EN 622 (all parts), *Fibreboards — Specifications.*

BS EN 635 (all parts), *Plywood — Classification by surface appearance.*

BS EN 755 (all parts), *Aluminium and aluminium alloys — Extruded rod/bar, tube and profiles.*

BS EN 942, *Timber in joinery — General classification of timber quality.*

BS EN 951:1999, *Door leaves — Method for measurement of height, width, thickness and squareness.*

BS EN 1027:2000, *Windows and doors — Watertightness — Test method.*

BS EN 1121:2000, *Doors — Behaviour between two different climates — Test method.*

BS EN 1670, *Building hardware — Corrosion resistance — Requirements and test methods.*

BS EN 12219:2000, *Doors — Climatic influences — Requirements and classification.*

BS EN ISO 7253 (BS 3900-F12), *Paints and varnishes — Determination of resistance to neutral salt spray (fog).*

BPF Standard, *Infill panels for doors and windows*, reference 355/1 June 1996.¹⁾

BPFWG *Code of practice for the reinforcement of windows and doors*, reference 323/1 October 1991.¹⁾

BPFWG *Guidelines for the selection and application of fasteners for the manufacture of windows and doors*, reference 335/3 May 1996.¹⁾

3 Terms and definitions

For the purposes of this Product Assessment Specification the following terms and definitions apply.

3.1

door

component for closing an opening in a wall that allows access or passage and may admit light when closed

3.2

door assembly

complete unit, as installed, consisting of the door frame, door leaf, any side panels or fanlights and essential hardware, any of which may be obtained from separate sources

3.3

door leaf

element which when fitted with hinges in a door frame forms part of a door assembly

3.4

door frame

part of a door assembly in which the door leaf moves

3.5

hardware

all the devices to facilitate opening, closing or making secure the door leaf in the frame such as hinges, hinge or dog bolts, door bolts, locks and latches, keeps, door furniture and lock cylinders

3.6

finger operated

equipment or hardware operated by the fingers only, without palm contact, which may or may not include a key

3.7

hand operated

equipment or hardware operated by use of the full hand, including palm contact, which may or may not include a key

¹⁾ Available from British Plastics Federation (BPF), 6 Bath Place, Rivington Street, London EC2A 3JE.

3.8**range**

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

3.9**cycle**

set of operations required to take the door from the closed and fully locked condition to the fully opened condition and back to the closed and fully locked condition

3.10**operating device**

item of hardware enabling the user to release and move a door leaf

4 Assessment procedure**4.1 Product range**

The product range shall be defined prior to the selection of the test samples. The definition shall include:

- a) product design specification, including profiles, beads, hardware, infills and reinforcements;
- b) size range and configurations;
- c) installation requirements;
- d) construction of any panels which may incorporate an opening vent;
- e) locking device options.

4.2 Sample selection

A suitable number of samples shall be selected which represents the most adverse and vulnerable aspects of a product range. Within each range a minimum of two samples is required. The following list, which is not exhaustive, identifies features that require consideration:

- a) distance between securing points fixing the leaf to the outer frame;
- b) directions of openings;
- c) glazing options, e.g. single or double glazed, construction of infill panels;
- d) glazing installation methods;
- e) range of sizes;
- f) low threshold options
- g) treatment of potential exposed surfaces;
- h) for doors subjected to **D.7** the colour likely to give the highest temperature during test.

NOTE The durability of the declared surface finish is assessed in Annex D for composite doors under the thermal cyclic tests (**D.7**).

4.3 Sequence of tests

The following test sequences shall be applied to separate samples.

Test sequence 1 (test sample 1)	Clause
a) Operating forces	6.3
b) Air permeability	6.2.1
c) Watertightness	6.2.2

d) Wind resistance	6.2.3
e) Repeat air permeability	6.2.1
f) Repeat watertightness	6.2.2
g) Resistance to vertical loads	6.4
h) Resistance to static torsion	6.5
i) Slamming resistance	6.6
j) Closure against obstruction	6.7
k) Abusive forces on handles	6.8
l) Resistance to soft and heavy body impact	6.9
m) Resistance to hard body impact	6.10

Test sequence 2 (test sample 2)	Clause
a) Operating forces	6.3
b) Cyclic operation test	6.11
c) Annex D tests where applicable	Annex D
d) Basic security test	6.14

5 Performance requirements

5.1 General requirements

All opening lights contained within a door assembly shall conform to the relevant performance standards.

All door assemblies shall conform to the most appropriate material specific requirements as detailed in annexes A, B, C and D.

All door assemblies shall be glazed in accordance with BS 6262.

NOTE Attention is drawn to BS 6262-4 which requires safety glass in most glazed door assemblies.

5.2 Weather performance requirements

5.2.1 Air permeability

The air permeability for the door assembly shall be as specified for the appropriate exposure category in Table 1.

5.2.2 Watertightness

The watertightness for the door assembly shall be as specified for the appropriate exposure category in Table 1. There shall be no leakage during the test up to and at the test pressure class given in Table 1.

5.2.3 Wind resistance

Where the design wind pressure is 800 Pa or less the exposure category for the door assembly is given in Table 1. For design wind pressures over 800 Pa, the actual pressure shall be stated and this shall be the maximum to which the door assembly is exposed to during the test. The deflection of members such as couplings, glazing bars or meeting stiles not retaining insulating glass units shall be limited to 1/125 of the span of the member. Such members retaining insulating glass unit shall not deflect more than 1/175 of the span of the unit. After wind resistance testing there shall be no permanent damage. For door assemblies classified as other than 800U no permanent damage shall be deemed to have occurred if:

- the performance level of a door assembly with initial air permeability values of up to 5 m³/h/m length does not increase by more than 1 m³/h/m length of opening perimeter.

more than 2 m³/h/m length of opening perimeter for initial air permeability values over 5 m³/h/m length;

- b) the performance value for air permeability is that required in Table 1 for the test pressure class achieved in the initial tests;
- c) the performance level for watertightness is that required in Table 1 for the test pressure class achieved in the initial tests;
- d) the requirements for operating forces specified in 5.3.1 are met.

For door assemblies classified as 800U no permanent damage shall be deemed to have occurred if the requirements for operating forces specified in 5.3.1 are met.

5.2.4 Classification

The weathertightness shall be determined when the door assembly has been tested in accordance with 6.2 and classified according to the exposure categories given in Table 1. To meet an exposure category the test pressure for all requirements shall be attained, or exceeded.

Table 1 — Exposure categories

Exposure category	Test pressure class		
	Air permeability ^a	Watertightness ^b	Wind resistance ^c
800U	No requirement	No requirement	800 Pa
800X	Up to 200 Pa (graph A)	50 Pa	800 Pa
800	Up to 200 Pa	100 Pa	800 Pa
Over 800	Up to 300 Pa (graph B)	200 Pa	Equal to actual wind pressure
NOTE Products designed to meet the requirements of part M of the Building Regulations 1991 [1] (applicable to England and Wales), the Building Standards Scotland 1990 [2] and the Building Regulations (Northern Ireland) 1994 [3] are unlikely to exceed category 800X.			
^a An air permeability test pressure class of 600 Pa (see BS 6375-1:1989, Figure 1) is applicable when stringent levels of performance are required, for example when exceptionally airtight doors are necessary as in air conditioned buildings, especially when opening directly into a habitable room. Where there is such a requirement, the exposure category should be suffixed with “Special” e.g. 800 Special. ^b The watertightness test pressure classes given cover most situations. Assemblies of higher performance than stated in the table should be considered where the assembly is located in exposed situations, at high levels on the building or when opening directly into a habitable room. A classification of “No Requirement” would be inappropriate for residential doors in some situations. ^c In wind resistance tests, where deflection is measured, e.g. in the case of door assemblies with side panels, the test pressure for that limiting deflection shall be stated by the manufacturer, where it is greater than 800 Pa.			

5.3 Mechanical performance

5.3.1 Operating forces

Operating forces acting on door assemblies shall be appropriate for their intended use. When tested in accordance with 6.3, the following requirements shall be met:

- a) throughout the test the door shall latch;
- b) the average force required to lock and unlock the hardware shall not exceed the following: