
Methods of testing Windows

Part 1. Air permeability test

Méthodes d'essais des fenêtres
Partie 1. Essai de perméabilité à l'air

Prüfmethoden für Fenster
Teil 1. Prüfung der Fugendurchlässigkeit

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Foreword

BS 5368 : Part 1 [EN 42] is the first Part of a series on methods of testing windows. Subsequent European Standards in the series will be published as further Parts of BS 5368.

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Descriptors : Windows, tests, air permeability, testing conditions, definitions.

English version

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Prüfmethoden für Fenster

Teil 1. Prüfung der Fugendurchlässigkeit

This standard was accepted by CEN as a European Standard on 15 October 1975 whereby the members committed to accord to it the status of a national standard must do so without change. The details of the conditions under which members are so committed are given in the CEN constitution.

Up-to-date lists of the national standards organizations which have adopted this European Standard, and relevant bibliographical references, may be obtained on application to the CEN Central Secretariat, or to the sales offices of any CEN member.

This European Standard exists in three versions (French, English, German) recognized by CEN as equivalent. National versions in other languages rank as translations, and in case of doubt should be checked against one of the recognized versions (French, English, German).

CEN members are the national standards organizations of Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: 5 Boulevard de l'Empereur, B-1000 Bruxelles

Brief history

The text of this standard, drawn up by a CEN working group, was submitted to the CEN members for ballot in April 1974, with a view to its adoption as a European Standard.

This standard was adopted by CEN on 15 October, 1975 as a result of its adoption by the following CEN members:

Austria, Belgium, Denmark, France, Italy, Netherlands, Spain, Switzerland and United Kingdom.

Methods of testing windows

Part 1. Air permeability test

1. Scope

This standard defines the method to be used for the air permeability test of windows to be fitted in exterior walls and supplied in the form of finished units in actual operating conditions.

2. Field of application

This standard applies to all windows, including door height windows made of any material, in the actual operating conditions in which they should be used and fixed according to the manufacturer's recommendations as in a finished building, bearing in mind the conditions of test as defined hereafter. The standard does not apply to the joints between the windows and surrounding components and material.

3. Terminology

3.1 pressure. The difference between the absolute air pressure on the external surface of a window and the absolute air pressure on the internal surface of the same window.

The difference is positive when the external pressure is higher than the internal pressure. In the other case, it is negative. This pressure is expressed in Pascals (Pa).*

3.2 air permeability. The property of a closed window to let air pass when it is submitted to a differential pressure. The air permeability is characterized by a flow of air expressed in m^3/h as a function of the pressure. This flow may be related to the opening surface area of the window (flow per unit of surface $\text{m}^3/(\text{h m}^2)$), or to the length of opening joints (flow per unit of length $\text{m}^3/(\text{h m})$), or to the total surface area of the window (flow per unit of surface $\text{m}^3/(\text{h m}^2)$).

3.3 opening light. Any part of a window that can be moved within the main frame. By convention, the surface of the opening light is equal to the apparent surface, seen from inside. The length of the joints is obtained from the same dimensions as those used for calculation of the surface area.

4. Apparatus

The basic test apparatus consists of the following:

- (1) a chamber with an opening to which the test window is fitted by its surround;
- (2) a means of providing a controlled differential air pressure across the window;
- (3) a device for rapid controlled changes of the differential air pressure operating between defined limits;
- (4) a means of measuring the flow of air into or out of the apparatus;
- (5) a means of measuring the difference in pressure between the two faces of the window.

5. Preparation of window for testing

A surround for the specimen to be tested shall be prepared. This shall be stiff enough to withstand the test pressures without deflecting to an extent likely to impair jointing or to impose bending stresses on the test specimen. When actual operational conditions are known, the fixing of the specimen may simulate these (e.g., a window in curtain walling).

The window shall be fixed plumb, square, and without twist or bends.

The window shall be cleaned in its entirety and dried.

The thickness, type of the glass and the method of glazing shall comply with the requirements of the manufacturer. In the case of no specification or when there is a possibility that the window shall be used with different glasses, tests shall be carried out with a glass of minimum thickness with respect to the surface area, as specified in the national standards.

6. Preparation for the test

The air temperature of the laboratory and the test chamber shall be measured and recorded in the report.

Three air pressure pulses shall be applied and the rate of application shall be over a period of not less than 1 s. Each pulse shall be maintained over 3 s at least.

These pulses shall be at a pressure 10 % higher than P_{max} required for the test, without however being less than 500 Pa.

With the pressure reduced to zero, all operating parts of the window shall be opened and closed five times and finally secured in the closed position.

Extraneous permeability of the apparatus shall be accounted for and preferably eliminated. Extraneous chamber permeability, when measured, shall be determined with the window specimen sealed, at the air pressure differences to be exerted during the window air permeability tests.

The metering equipment for the measurement of the window air permeability may be used for measuring the extraneous permeability or it may be necessary to provide additional air metering equipment.

The method adopted to measure permeability shall be clearly stated in the test report.

7. Test

The window shall be subjected to increasing positive pressure in stages for periods of at least 10 s up to the maximum pressure required for the test.

These pressures shall be 50, 100, 150, 200, 300, 400, 500 and 600 Pa and can then be increased in steps of 250 Pa maximum if the pressure required for the test is, exceptionally, higher than 600 Pa.

The pressures shall then be applied in the reverse order.

NOTE. If it is required to test a window for air permeability in the reverse direction, i.e., under negative pressure, this same method shall be used.

*1 Pa = 1 N/m² = 0.102 mmH₂O.

8. Diagrams

Diagrams 1 and 2 show the sequence of operation for:

a required pressure P_{\max} less than 600 Pa, for example, of 300 Pa (see diagram 1);

a required pressure P_{\max} greater than 600 Pa, for example, of 700 Pa (see diagram 2).

9. Expression of results

The air permeability readings at each pressure shall be recorded. The higher of the two readings at each pressure, increasing as well as decreasing, shall be noted in the report.

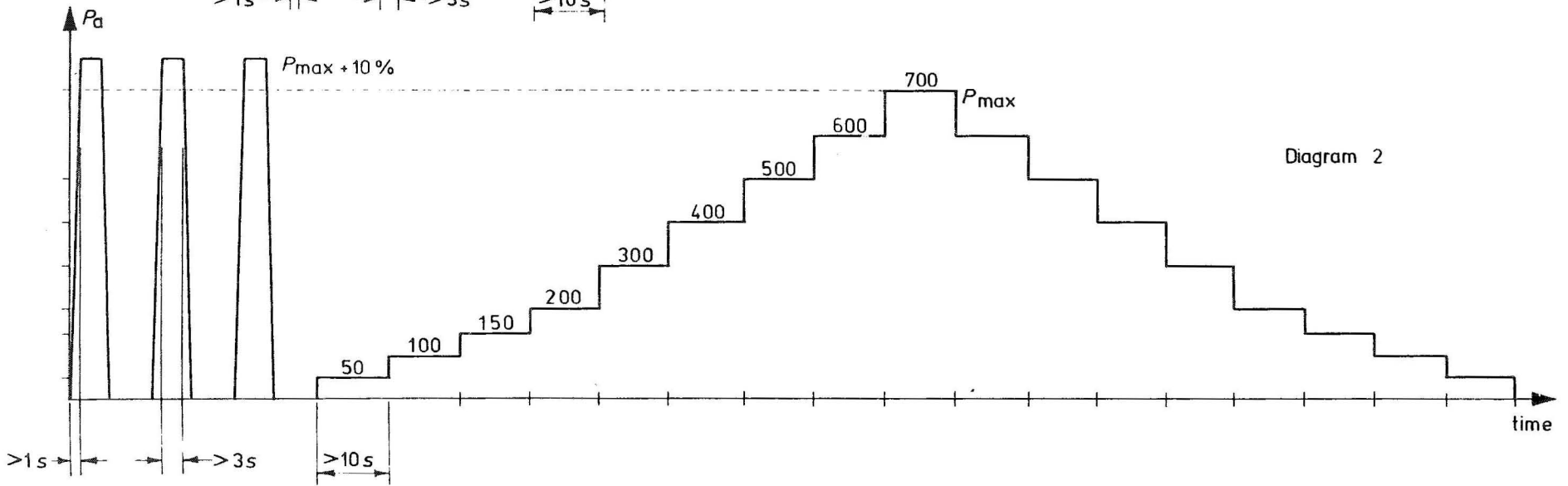
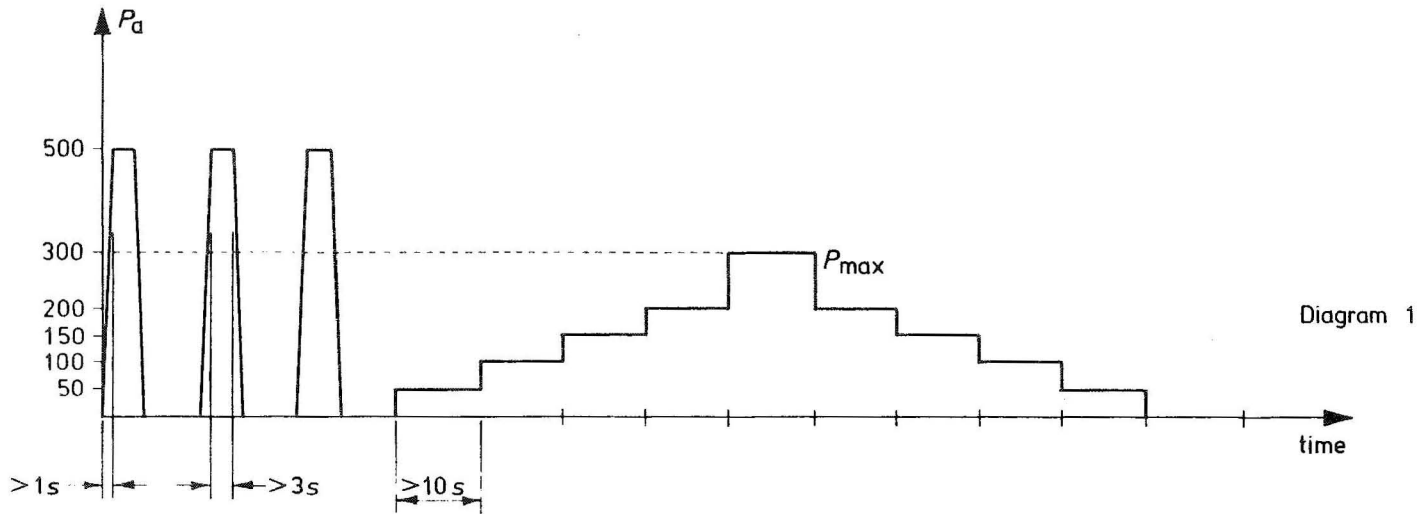
For each window tested, record the volume of air flow passing through the specimen expressed as cubic metres of air per hour:

- (a) per metre of length of opening joint;
- (b) per square metre of opening light;
- (c) per square metre of total surface area of the window.

These shall be plotted on two graphs against rising pressure and the graphs shall be included in the test report.

10. Form of test report

The test report shall be presented in accordance with EN 78.*



National Appendix A

The United Kingdom participation in the preparation of this European Standard came under the authority of the Building Divisional Council. The following organizations were involved in the work on this standard:

Aluminium Window Association
Association of Builders' Hardware Manufacturers
British Plastics Federation
British Woodwork Manufacturers' Association
Department of the Environment Building Research Establishment
Department of the Environment, Housing and Construction

Department of the Environment, Property Services Agency
Fibre Building Board Development Organization Ltd.
Flat Glass Manufacturers' Association
Greater London Council
Incorporated Association of Architects and Surveyors
Institution of Fire Engineers
Interdepartmental Construction Development Group
Metal Window Federation of Great Britain
Modular Society
Royal Institute of British Architects
Timber Research and Development Association

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Contract requirements

Attention is drawn to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

Revision of British Standards

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following BSI references relate to the work on this standard:
Committee reference B/142 Draft for comment 74/11607

Cooperating organizations

The European Committee for Standardization, under whose supervision this European Standard was prepared, comprise the national standards organizations of the following Western European countries:

Austria	Oesterreichisches Normungsinstitut
Belgium	Institut Belge de Normalisation
Denmark	Dansk Standardiseringsraad
Finland	Suomen Standardisoimisliitto, r.y.
France	Association Française de Normalisation

Germany	Deutscher Normenausschuss
Ireland	Institute for Industrial Research and Standards
Italy	Ente Nazionale Italiano di Unificazione
Netherlands	Nederlands Normalisatie - instituut
Norway	Norges Standardiseringsforbund
Portugal	República de Normalização
Sweden	Sveriges Standardiseringskommission
Switzerland	Association Suisse de Normalisation
United Kingdom	British Standards Institution

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