BRITISH STANDARD

BS EN
12835:2001

Airtight shutters — Air permeability test

The European Standard EN 12835:2000 has the status of a British Standard

ICS 91.060.50

National foreword

This British Standard is the official English language version of EN 12835:2000.

The UK participation in its preparation was entrusted by Technical Committee B/538, Doors, windows, shutters, hardware and curtain walling, to Subcommittee B/538/3, Domestic shutters and blinds, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 9 and a back cover.

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This British Standard, having been prepared under the direction of the Sector Committee for Building and Civil Engineering, was published under the authority of the Standards Committee and comes into effect on 15 January 2001

ISBN 0 580 36890 4

Amendments issued since publication

Amd. No.	Date	Comments

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12835

November 2000

ICS 91.060.50

English version

Airtight shutters - Air permeability test

Fermetures étanches - Essai de perméabilité à l'air

Luftdichte Abschlüsse - Prüfung der Luftdurchlässigkeit

This European Standard was approved by CEN on 27 October 2000.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN 12835:2000 E

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 33 "Doors, windows, shutters, building hardware and curtain walling", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2001, and conflicting national standards shall be withdrawn at the latest by May 2001.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

It is part of a series of standards dealing with blinds and shutters for buildings as defined in prEN 12216:1995.

The additional thermal resistance provided by shutters positioned in front of windows in the closed position depends on their air permeability in the conditions defined by the standards prEN ISO 10077-1:1999, the criteria of attribution of a class of air permeability being developped in prEN 13125:1998.

The annexes A and B are normative.

1 Scope

This European Standard specifies a test method for determining the air permeability of shutters that claim to conform to class 5 of thermal resistance "airtight shutters" according to standards prEN ISO 10077-1:1999 and prEN 13125:1998, when allocation cannot be given by geometrical criteria.

2 Normative reference

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

prEN ISO 10077-1:1999	"Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Part 1 : simplified method (ISO/FDIS 10077-1:1999)"
EN 12114:2000	"Thermal performance of buildings - Air permeability of building components and building elements - Laboratory test method"

prEN 12216:1995 "Terminology and definitions for blinds and shutters"

prEN 13125:1998 "Shutters and blinds - Additional thermal resistance - Classification - Attribution of a class to a product"

3 Terms and definitions

For the purposes of this Standard, the terms and definitions given in prEN 12216:1995, and EN 12114:2000 together with the following apply :

3.1
test pressure
positive difference of static air pressure ΔP between the two faces of the test specimen. It is expressed in pascals [Pa].

3.2
positive difference of pressure positive
the pressure acting on the external face of the test specimen is greater than that acting on the internal face.

3.3
air permeability
airflow rate crossing the test specimen, under ambiant conditions, expressed in m^3/h and by surface area of the shutter expressed in m^2 and for a positive difference of pressure of 10 Pa.

3.4
overall surface area
area calculated from the overall dimensions of the test specimen.

4 Principle

The principle of the test adopted is specified in EN 12114:2000, the test conditions being simplified in order to take into account the low difference in pressure involved in the thermal exchanges between the external face and the internal face of the shutters.

The test consists of a set of positive air pressure difference steps and measurement of the air flow rate of each step with a suitable device. The air permeability of the shutter is determined in clause 8.

5 Apparatus (see figure 1)

The test apparatus includes :

- An airtight casing with an opening in which the test specimen is installed.

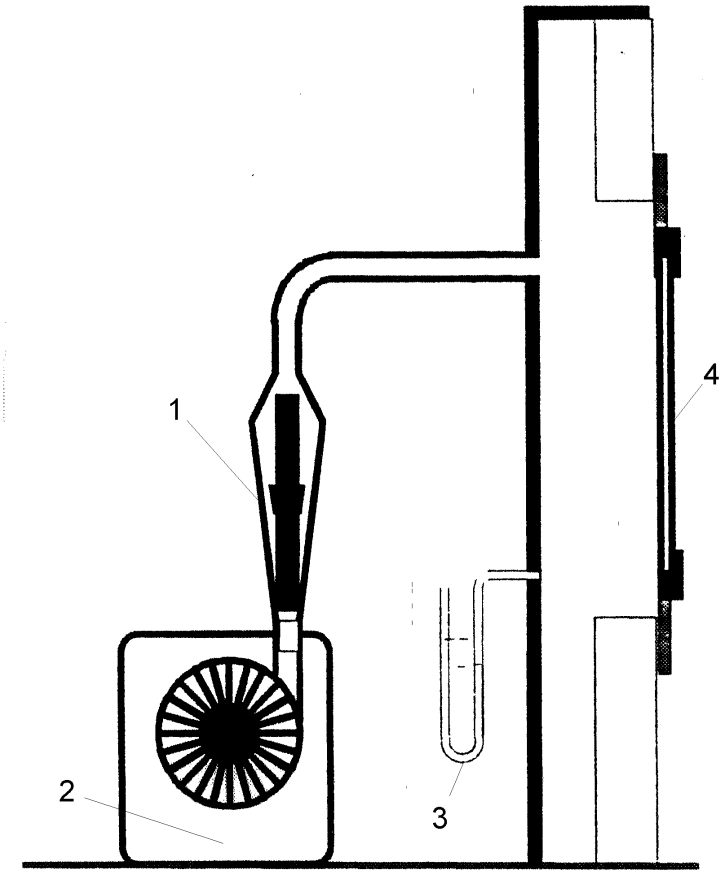
The casing is installed in a closed room. The airtightness of the casing is checked according to Annex B. This casing is also sufficiently rigid to withstand test pressures without sustaining damage that could interfere with the results.

- Means of applying a controlled difference of air pressure to the test specimen (up to 100 Pa).

- Means of producing rapid changes of air pressure differences, within specified limits.

- An apparatus for measuring the air flow rate in the casing capable of evaluating air leakage through the test rig to an accuracy of $\pm$ 5% in relation to the permitted values of the class, calibration at normal temperature and air pressure (20 °C and 101,3 k Pa).

- Means of measuring controlled pressure (range 0 to 100 Pa) with an accuracy of $\pm$ 10 %.



Key

1 Flowmeter
2 Blower
3 Manometer
4 Test specimen

Figure 1 - Example of apparatus (from EN 12114:2000)

6 Test specimen

The test specimen is provided by the manufacturer in the dimensions H x L = (1,40 m $\pm$ 0,40 m) x (1,45 m $\pm$ 0,40 m) and equipped with all its accessories. This includes the arrangements laid out and described for air tightness (designation of air tightness profiles, rebates, etc.). It is mounted in the rig using a frame sufficiently resistant to withstand test pressures. The airtightness between the test rig and the frame shall be ensured.

The installation of the test sample in the rig shall conform to the installation instructions supplied by the applicant and respecting the peripheral gaps, fixed plumb in both directions,

level, square and without visible twists or bends induced by the fixings. It shall be clean and dry.

The test sample shall be able to function normally.

7 Test method

7.1 Conditions of testing

The preliminary measurements of the air temperature, atmospheric pressure and relative humidity shall be in accordance with the specifications in EN 12114:2000.

The pressure difference steps are :

- maximum pressure difference, Δp_{max} = 50 Pa
- minimum pressure difference, Δp_{min} = 10 Pa

It is the smallest pressure difference measurable with an accuracy of 1 Pa.

- 5 intermediate steps : 15 Pa, 20 Pa, 25 Pa, 30 Pa, 40 Pa.

7.2 Airflow rate measurement

Open and close all mobile parts of the curtain twice before blocking them in closed position.

Apply 3 air pressure pulses at 56 Pa. The duration of pressure increase shall not be less than 1 s. Each pulse shall be maintained for at least 3 s.

Apply then the air pressure difference at each of the steps : 10 Pa, 15 Pa, 20 Pa, 25 Pa, 30 Pa, 40 Pa, 50 Pa. Measure and record the value of the corresponding air flow rates Q_m in m^3/h. The measurement is carried out when the air pressure has stabilised with a minimum duration of 10 s per step.

Carry out the corrections of air temperature, atmospheric pressure, relative humidity for the reference conditions as specified in EN 12114:2000.

8 Expression of results

At each step of the pressure difference, express :

a) $Q_{m/s}$, the airflow rate reduced to the m^2 of the overall surface area ***S*** of the test specimen : $Q_{m/s}$, $[m^3/h \cdot m^2]$;

b) Plot $Q_{m/s}$, against the corresponding pressure difference using a log - log plot ;

c) Determine the flow coefficient ***C*** and the exponent **n** from the formulae $Q_{m/s} = C\,(\Delta P)^n$ and their confidence intervals using the method of identification given in annex B of EN 12114:2000 (linear regression technique) ;

d) Give the value of the air permeability of the shutter under a pressure of 10 Pa calculated from the formulae.

9 Test report

The test report shall include :

a) reference to this standard and to EN 12114:2000 ;

b) a concise description of the test specimen, including at least the following information, checked before the test :

- manufacturer's name and specific brand ;
- width, height, overall area, type of materials and, if applicable, their surface treatment ;
- plans with details of the test specimen or the reference to documents which give this information. This plan shall show the position of the fixing devices ;
- other information as appropriates.

c) description of the test conditions, including at least the following :

- air temperature in the laboratory ;
- details of mounting the test specimen in its surround (in the casing) ;
- maximum and minimum pressure differences ;
- testing organisation and date of test,

d) graph showing the air flow rate as a function of pressure difference ;

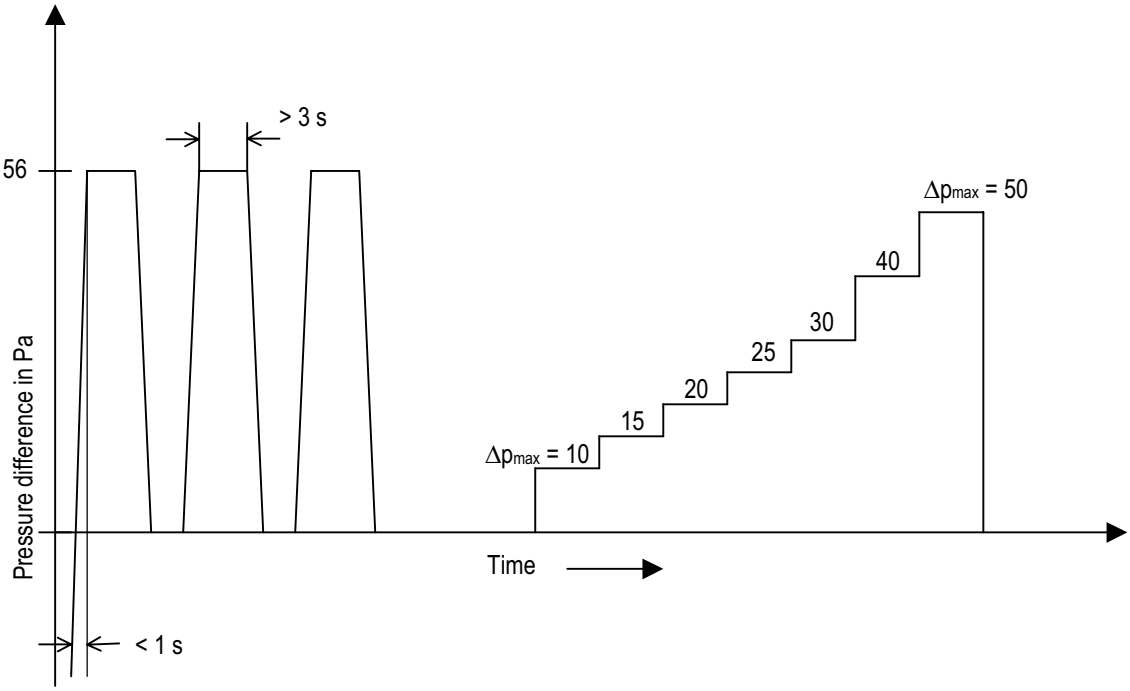
e) the leakage coefficients ***C*** and ***n*** with their confidence limits ;

f) mention of the existence of any leaks found during the test and of their position ;

g) the air permeability valve of the shutter under a pressure of 10 Pa.

ANNEX A (normative)

Pressure sequence for air permeability tests (Airtight casing)



ANNEX B (normative)

Testing of the rig for airtightness

The airtightness of the casing shall be verified at least once a year by replacing the test specimen by an airtight panel and by following the procedure described in 7.2.

The casing is considered to be airtight if the residual air flow rate remains less than $\left(\frac{P}{10}\right)^{1/2}$ [m^3/h] at each pressure step for an opening of 2 m^2.

Accordingly, the airflow rates shall remain less than the values given below.

Pressure differences (Pa)	10	15	20	25	30	35	40	50
Maximum residual airflow rates [m^3/h]	1	1,2	1,4	1,5	1,7	1,8	2	2,2

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