

Curtain walling — Air permeability — Performance requirements and classification

The European Standard EN 12152:2002 has the status of a
British Standard

ICS 91.060.10

National foreword

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The UK participation in its preparation was entrusted by Technical Committee B/538, Doors, windows, shutters, hardware and curtain walling, to Subcommittee B/538/6, Curtain walling, which has the responsibility to:

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This British Standard, having been prepared under the direction of the Building and Civil Engineering Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 26 March 2002

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 10, an inside back cover and a back cover.

The BSI copyright date displayed in this document indicates when the document was last issued.

Amendments issued since publication

Amd. No.	Date	Comments

© BSI 26 March 2002

ISBN 0 580 39416 6

ICS 91.060.10

English version

Curtain walling - Air permeability - Performance requirements and classification

Façades rideaux - Perméabilité à l'air - Exigences de
performance et classification

Vorhangfassaden - Luftdurchlässigkeit -
Leistungsanforderungen und Klassifizierung

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Foreword

This document EN 12152:2002 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of an identical text or by endorsement, at the latest by August 2002, and conflicting national standards shall be withdrawn at the latest by August 2002.

This European Standard is part of a series of European Standards dedicated to curtain walling products and derives from performance requirements.

This European Standard forms part of a series of curtain walling standards as specified in the Product Standard prEN 13830.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies requirements and classification of air permeability of both fixed and openable parts of curtain walling, under positive and negative static air pressure.

NOTE This European Standard applies to curtain walling as specified in prEN 13830.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the 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).

EN 12153, *Curtain walling – Air permeability – Test method.*

EN 12207, *Windows and doors – Air permeability – Classification.*

prEN 13119, *Curtain walling – Terminology.*

prEN 13830, *Curtain walling – Product Standard.*

ENV 1991-2-4, *Eurocode 1: Basis of design and actions on structures – Part 2-4: Actions on structures – Wind action.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in prEN 13119 together with the following apply:

3.1 test pressure

differential air pressure between the two faces of the test specimen, expressed in Pascals (Pa)

3.2 positive pressure

when the outer face is subjected to higher air pressure than the inner face

3.3 negative pressure

when the outer face is subjected to lower air pressure than the inner face

3.4 air permeability

passage of air through the curtain walling when subjected to positive or negative air pressure

The volume being expressed as a rate in cubic metres per hour (m^3/h), this rate being related to the overall area of the curtain walling. Alternatively, the rate can be related to the metre length of joint.

3.5**fixed joint**

all joints except openable joints of the curtain walling (see Figure 3)

3.6**fixed joint length**

sum of the length of all fixed joints within the curtain walling measured along the line of the air seal/barrier. Where a window is included within the curtain walling, the length of the perimeter joint shall be included in the calculation (see Figure 3)

3.7**openable joint**

perimeters of all moving frames, in accordance with EN 12207

3.8**overall area**

sum of the areas of all the faces measured parallel to all fixed and openable panels (see Figure 2). It shall be expressed in m².

4 Requirements

4.1 The air permeability for the fixed areas of the curtain walling shall take no account of the passage of air through openable joints and shall be related to the positive pressures applied and the overall area, or the fixed joint lengths, of the test specimen.

The air permeability per m² allowed for classification purposes is related to positive test pressures as shown in Table 1, and the air permeability per metre length of joint is related to positive test pressures as shown in Table 2.

4.2 Air permeability performance requirements of a curtain wall shall be established from Table 1 or Table 2 which are derived from maximum positive test pressures equating to 0,25 of the design wind load as determined in ENV 1991-2-4.

For intermediate test pressures (P_n) the air permeability allowed (Q_n) shall be determined using the formula:

$$Q_n = Q_o \left[\frac{P_n}{P_o} \right]^{2/3}$$

Q_n Permissible air permeability at intermediate positive test pressure P_n

Q_o Permissible air permeability at maximum positive test pressure P_o

4.3 Where elevation layouts incorporate a large number of smaller pane units with associated mullions and transoms, it may be beneficial to express air permeability in terms of metre length of fixed joint, in lieu of m² of curtain wall area. In such conditions Table 2 shall apply, based on 0,5 cubic metres per metre per hour (m³/m · h).

4.4 The air permeability for openable parts of curtain walling (e.g. windows within curtain walling facade) shall be related to EN 12207.

5 Test method

The test specimen shall be tested in accordance with EN 12153.

NOTE The test sequence as specified in prEN 13830 should be followed.

6 Classification

Five classes are specified in order to adequately cover all location and regional conditions likely to be experienced. (see Figure 1 and Table 1, or alternatively Table 2).

For the relevant class, the air permeability at the maximum test pressure indicated in Table 1 or Table 2, and the air permeability at the intermediate test pressures specified in EN 12153 and calculated in accordance with 4.2, shall not exceed that allowed, through the entire range of specified test pressure steps.

According to the results of the tests, the fixed element curtain walling product can be classified as indicated in Table 1, or alternatively in Table 2, and by reference to Figure 1.

**Table 1 — Air permeability classes (A)
Based on overall area**

Maximum pressure P_{max} (Pa)	Air permeability $m^3/m^2 \cdot h$	Class
150	1,5	A1
300	1,5	A2
450	1,5	A3
600	1,5	A4
> 600	1,5	AE

6.1 Specimens which leak air $> 1,5 m^3/m^2 \cdot h$ at pressures < 150 Pa cannot be classified.

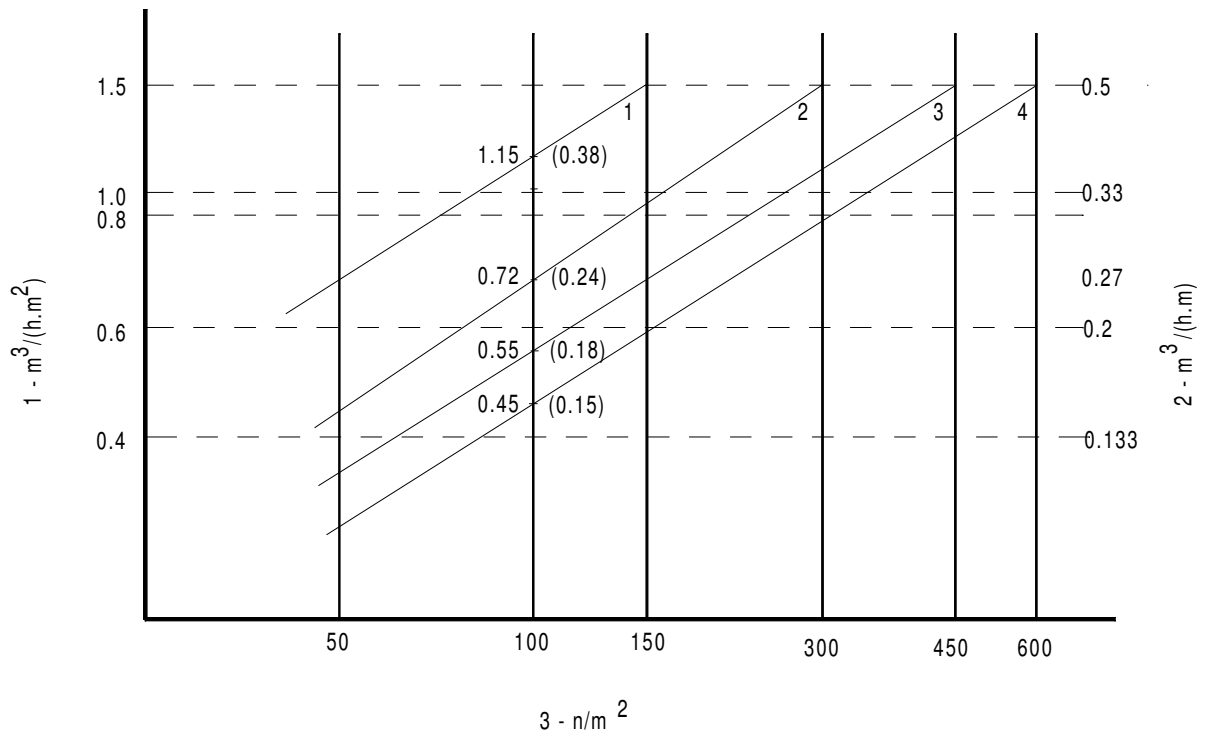
6.2 Specimens which leak air $< 1,5 m^3/m^2 \cdot h$ at pressures > 600 Pa are classified E (Exceptional) (see Figure 1).

**Table 2 — Air permeability classes (A)
Based on fixed joint length**

Maximum pressure P_{max} (Pa)	Air permeability $m^3/m \cdot h$	Class
150	0,5	A1
300	0,5	A2
450	0,5	A3
600	0,5	A4
> 600	0,5	AE

6.3 Specimens which leak air $> 0,5 m^3/m \cdot h$ at pressures < 150 Pa cannot be classified.

6.4 Specimens which leak air $< 0,5 m^3/m \cdot h$ at pressures > 600 Pa are classified E (Exceptional) (see Figure 1).

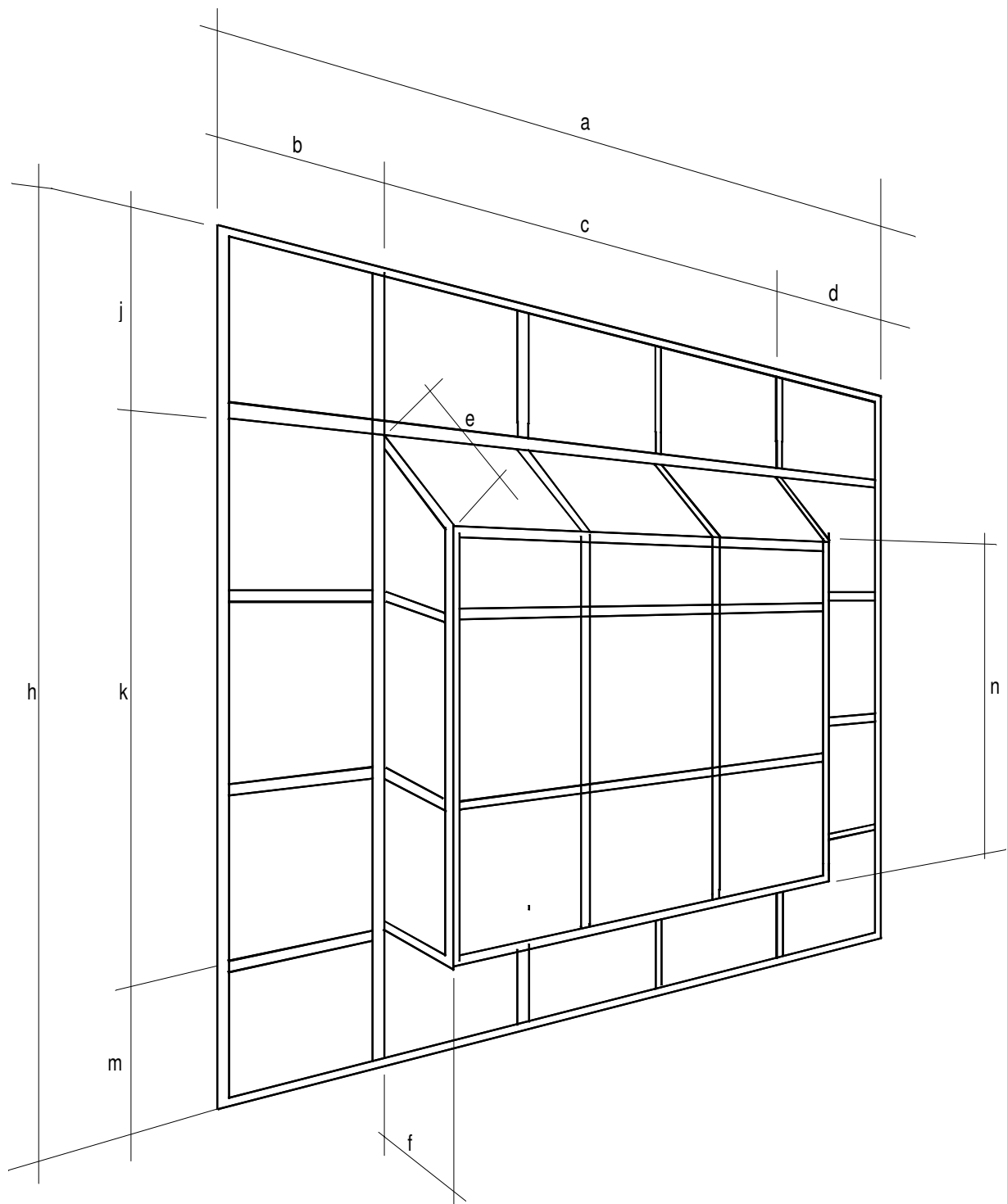


Key

- 1 Fixed panel by area – $\text{m}^3/\text{m}^2 \cdot \text{h}$
- 2 Fixed panel by joint length – $\text{m}^3/\text{m} \cdot \text{h}$
- 3 Pressure in Pascals (Pa).

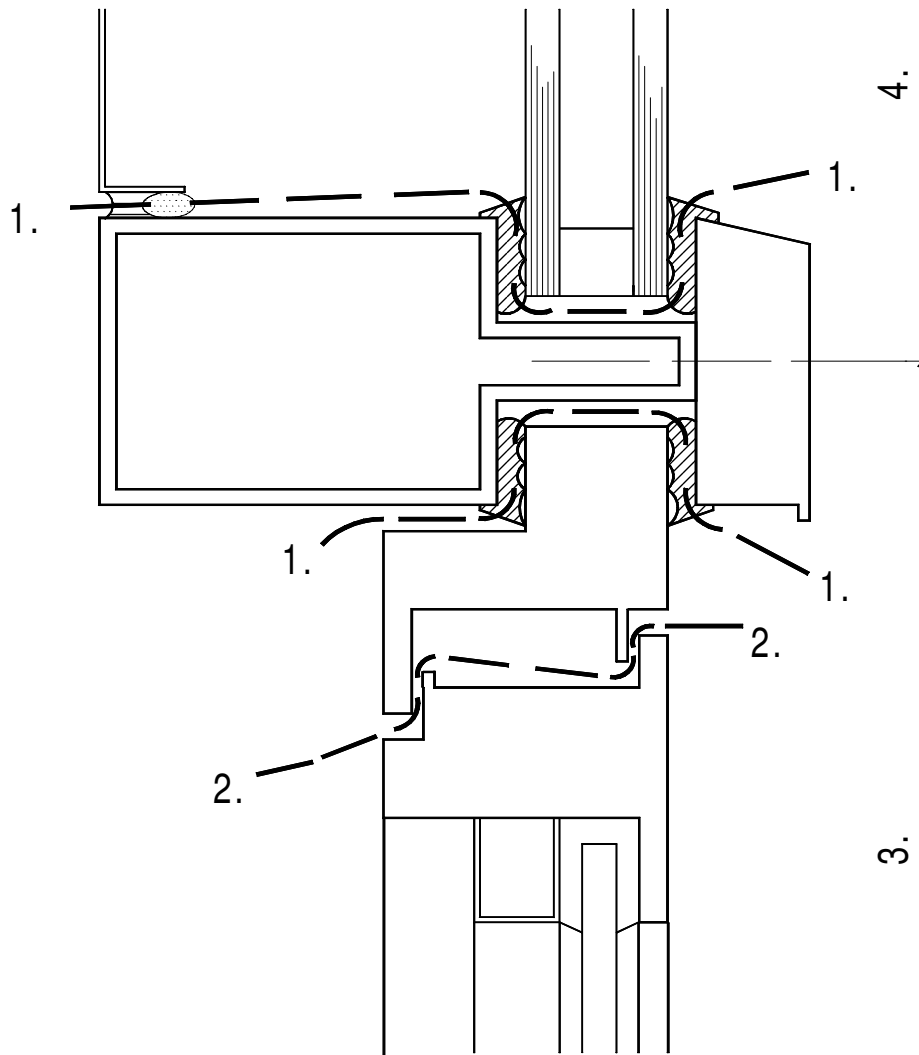
Figure 1 — CLASSIFICATION - Maximum permissible air permeability

NOTE The exceptional category is attained when air permeability at all pressure steps is that for a higher performance class than A4, +10 %.



$$\text{Total area} = (a \times j) + (a \times m) + (b \times k) + (d \times k) + (c \times n) + (c \times e) + (c \times f) + 2(f \times n) + \{(k - n) \times f\}$$

Figure 2 — Example of calculation of overall area



Key

- 1 Fixed joint
- 2 Openable joint according to EN 12207
- 3 Openable panel
- 4 Fixed panel

Figure 3 — Example of fixed and openable joint

Bibliography

EN 1026, *Windows and doors – Air permeability – Test method.*

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