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SLOVENSKI STANDARD
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Obešene fasade - Prepustnost zraka - Zahteve in klasifikacija

Curtain walling - Air permeability - Performance requirements and classification

Vorhangfassaden - Luftdurchlässigkeit - Leistungsanforderungen und Klassifizierung

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

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91.060.10	Stene. Predelne stene. Fasade	Walls. Partitions. Facades

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EUROPEAN STANDARD

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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

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 33.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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prEN 12152:2022 (E)

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European foreword

This document (prEN 12152:2022) 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 document is currently submitted to the CEN Enquiry.

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

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

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prEN 12152:2022 (E)

1 Scope

This document 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 document applies to curtain walling as specified in EN 13830.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12153, *Curtain walling — Air permeability — Test method*

EN 12207, *Windows and doors — Air permeability — Classification*

EN 13119, *Curtain walling — Terminology*

EN 13830, *Curtain walling — Product standard*

EN 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 document, the terms and definitions given in EN 13119 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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)

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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 m^2

4 Symbols and abbreviations

5 Requirements

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 both to the positive and negative pressures applied and the overall area, or the fixed joint lengths, of the test specimen.

The air permeability per m^2 allowed for classification purposes is related to the test pressures according to negative and positive pressures (numerical average of the air permeability expressed in absolute value, resulting in one class) as shown in Table 1, and the air permeability per metre length of joint is related to positive and negative tests (numerical average of the air permeability expressed in absolute value, resulting in one class) pressures as shown in Table 2.

Air permeability performance requirements of a curtain wall shall be established from Table 1 or Table 2 which are derived from the numerical average expressed in absolute value of positive and negative tests pressures equating to 0,25 of the design wind load as determined in EN 1991-2-4.

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

$$Q_n = Q_o \left[\frac{P_n}{P_0} \right]^{2/3} \tag{1}$$

where

Q_n is the permissible air permeablilty at intermediate positive and negative tests pressure P_n;

Q_o is the permissible air permeability at maximum positive and negative tests test pressure P_o.

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

m^2 of curtain wall area. In such conditions Table 2 shall apply, based on 0,5 m³ per metre per hour (m^3/m · h).

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

6 Test methods

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

Two air permeability tests shall be carried out: one with positive test pressures and one with negative test pressures.

The test sequence as specified in EN 13830 should be followed.

7 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 Clause 5, shall not exceed that allowed, through the entire range of specified test pressure steps.

The test report shall refer to both negative and positive pressure tests, in order not to lose the details of the two different pressure test results.

For classification purposes, the test result is defined as the numerical average of the two air permeability results at negative and positive pressures (expressed in absolute value as $m^3/m^2 \cdot h$ or $m^3/m \cdot h$) at each pressure steps, resulting in only one class.

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) at positive and negative pressures (numerical average), based on overall area

Maximum positive and negative pressure P_{max} (Pa)	Numerical average of the two air permeability results at negative and positive pressures $m^3/m^2 \cdot h$	Class
150	1,5	A1
300	1,5	A2
450	1,5	A3
600	1,5	A4
> 600	1,5	AE xxx

Specimens which leak air > 1,5 m^3/m² · h at pressures < 150 Pa cannot be classified.

Specimens which leak air < 1,5 m^3/m² · h at pressures > 600 Pa are classified E (Exceptional) (see Figure 1).

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Where P_{max} is > 600 Pa, the final test pressure shall be quoted in the test report and the final pressure shall be indicated as a suffix to the classification, ie AE 750: AE 900: etc.

Table 2 — Air permeability classes (A) at positive and negative pressures (numerical average), based on fixed joint length

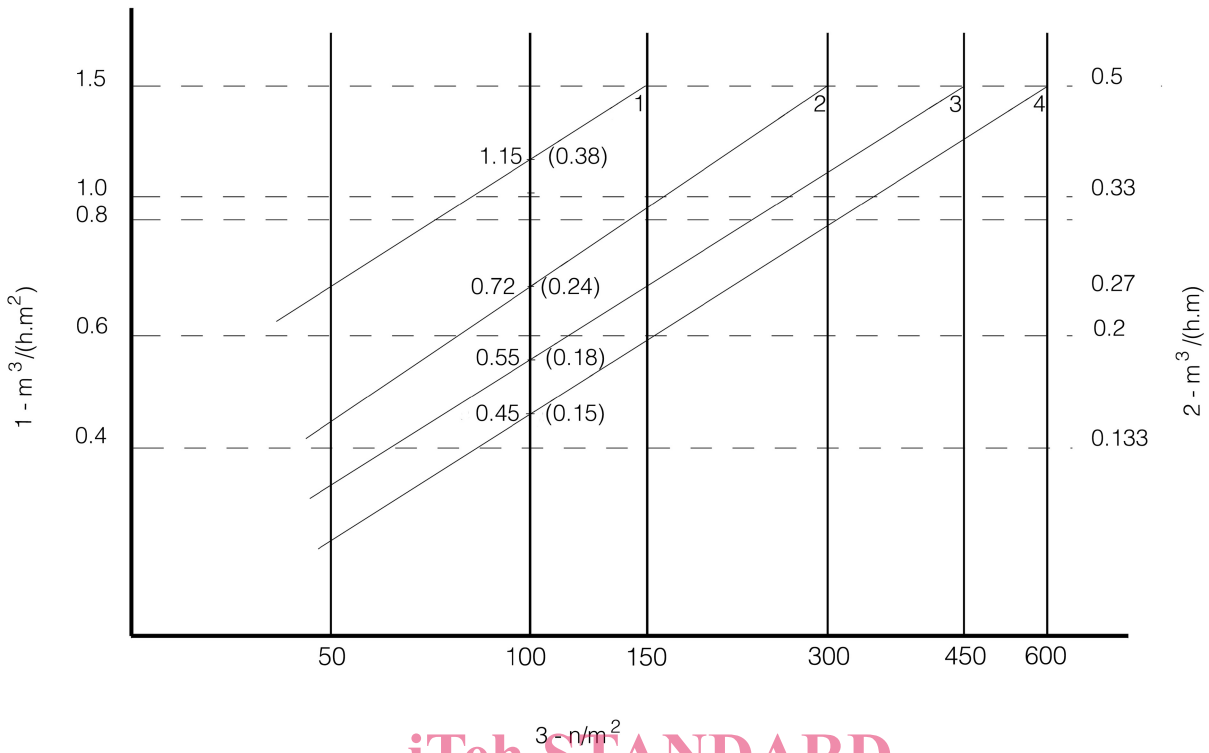| Maximum positive and negative pressure P_{max} (Pa)	Numerical average of the two air permeability results at negative and positive pressures $m^3/m \cdot h$	Class
150	0,5	A1
300	0,5	A2
450	0,5	A3
600	0,5	A4
> 600	0,5	AE xxx

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

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

Where P_{max} is > 600 Pa, the final test pressure shall be quoted in the test report and the final pressure shall be indicated as a suffix to the classification, i.e. AE 750: AE 900: etc.

Key

1 fixed panel by area – $m^3/m^2 \cdot h$ (expressed as numerical average of the two air permeability results at negative and positive pressures)

2 fixed panel by joint length – $m^3/m \cdot h$ (expressed as numerical average of the two air permeability results at negative and positive pressures)

3 pressure in Pascals (Pa)

Figure 1 — CLASSIFICATION - Maximum permissible air permeability

NOTE   In order to attain the exceptional category (AE xxx), it is necessary that the performance of air permeability (calculated in accordance with chapter 5 and expressed as numerical average of the two air permeability results at negative and positive pressures – see Key 1 and 2 of Figure 1), is higher than the performance of air permeability at the maximum test pressure (P_{max}) + 10 % of class A4, at all pressure steps (see Key 3 of Figure 1) and through the entire range of specified test pressure steps.