



**SLOVENSKI STANDARD**  
**oSIST prEN 12153:2022**  
**01-junij-2022**

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**Obešene fasade - Prepustnost zraka - Preskusna metoda**

Curtain walling - Air permeability - Test method

Vorhangfassaden - Luftdurchlässigkeit - Prüfverfahren

Façades rideaux - Perméabilité à l'air - Méthode d'essai

**Ta slovenski standard je istoveten z: prEN 12153**

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**ICS:**

91.060.10

Stene, Predelne stene, Fasade  
Walls, Partitions, Facades  
Fasade

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EUROPEAN STANDARD  
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**DRAFT**  
**prEN 12153**

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Will supersede EN 12153:2000

English Version

## Curtain walling - Air permeability - Test method

Façades rideaux - Perméabilité à l'air - Méthode d'essai

Vorhangfassaden - Luftdurchlässigkeit - Prüfverfahren

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

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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## European foreword

This document (prEN 12153:2022) 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 contains a bibliography which provides for the inclusion of additional information in the expression of the test results.

This document is part of a series of European Standards dedicated to curtain walling products.

This document forms part of a series of curtain walling performance requirements as defined in the product standard EN 13830.

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## prEN 12153:2022 (E)

### 1 Scope

This document defines the method to be used to determine the air permeability of curtain walling, both its fixed and openable parts. It describes how the specimen shall be tested under positive and negative air pressure.

NOTE This document applies to any curtain walling product as defined 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 12152, *Curtain walling — Air permeability — Performance requirements and classification*

EN 13119, *Curtain walling — Terminology*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply / 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 pressure between the two faces of the test specimen, expressed in Pascals (Pa)

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#### 3.2

##### **positive pressure**

when outer face is subjected to higher pressure than inner face

#### 3.3

##### **negative pressure**

when inner face is subjected to higher pressure than outer face

#### 3.4

##### **air permeability**

passage of air through the construction of the curtain walling when subjected to air pressure

The volume being expressed as a rate in cubic metres per hour (m<sup>3</sup>/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 those between openable parts of the curtain wall

Where a window is incorporated in the specimen it shall be considered as a panel for the purpose of the fixed joint calculation

**3.6****fixed joint length**

sum of the perimeters of all fixed and openable panels (windows) within the specimen, having regard to the position of the principle air barrier

**3.7****openable joint length**

sum of the perimeters of all moving frames within the test specimen

**3.8****overall area**

sum of the areas of all the faces of the specimen that are enclosed within the test chamber, measured parallel to all fixed and openable panels (see Figure 2). It shall be expressed in square metres (m<sup>2</sup>)

**4 Symbols and abbreviations****5 Principle**

Application of increasing and decreasing pressure steps (positive or negative) with measurements of air flow at each test pressure.

**6 Apparatus**

A chamber with an opening into which the test specimen can be fitted. This chamber shall be of sufficient strength and rigidity to withstand the test pressures likely to be imposed during the tests. It shall not deflect under test pressure to any extent which would affect the performance of the test specimen (see Figure 1).

Adequately representative structural supports shall be provided to which the specimen shall be attached in accordance with the conditions of use in the works (see also 7.1).

The chamber shall be constructed so that the air permeability through it, at pressures up to the maximum test pressure, does not exceed the permissible air permeability through the specimen at the same pressure.

A means for applying controlled positive (or negative) test pressures to the test specimen.

A means by which rapidly controlled changes of positive (or negative) test pressures may be produced within defined limits.

A means of measuring the air flow into the chamber within an accuracy of  $\pm 5\%$  in order to enable the quantity of air permeability through the specimen to be assessed within an accuracy of 10 % of the permissible air permeability through the specimen.

A means of measuring the positive (or negative) test pressures, steady or fluctuating, calibrated within an accuracy of  $\pm 5\%$ .

A temporary means of sealing all joints of the specimen during the determination of test chamber leakages.

**prEN 12153:2022 (E)****7 Test methods****7.1 Test specimen**

The specimen shall be submitted in a fully operable condition, ready for use. It shall be supplied in a suitable manner for fixing onto a test chamber. The test specimen shall not be less than two typical units wide and shall be sufficient to provide full loading on at least one typical vertical joint or framing member or both. The specimen shall not obtain additional stiffness from the test chamber. The height shall not be less than the full distance between the curtain wall's point of connection to the building structure.

For custom designed curtain walls or special elements, the specimen shall be a size which is adequate to demonstrate its compliance with the specified requirements.

All parts of the specimen shall be full size, using the same materials, details, methods of construction and fixing as intended for use in the works. Conditions for connection to the structural support shall simulate those in the works as accurately as possible (see also Clause 6).

This standard does not apply to the perimeter joints between the curtain walling and the test chamber, or to the joints between the curtain walling and the building construction.

**7.2 Test preparation**

Build the test specimen into the test chamber.

Fix true to the normal attitude of use in both directions, level, square and without visible twist or bend as a result of the application of fixing devices.

Remove all transport blocks, bracings or packings and protective wrappings.

Tape all openable joints to prevent air infiltration.

Tape seal any ventilation devices, where these may occur.

Ensure any leakage through all points, including frame joints, is readily detectable.

Ensure all joints between the test specimen and the test chamber are sealed.

Ensure the specimen is clean prior to commencing the test sequence.

**7.3 Test procedure**

For classification, select the maximum test pressure ( $P_{max}$ ) according to EN 12152.

Apply test pressures, throughout the following procedures, in increments of 50 Pa up to 300 Pa and increments of 150 Pa up to the maximum test pressure (Figure 3).

Determine the air permeability ( $Q_C$ ) of the test chamber only, excluding the effect of the test specimen.

NOTE If this is already known from previous tests, 7.3.1 is carried out.

Seal the specimen airtight to isolate it from the test chamber.

Apply 3 pulses of positive pressure equal to 500 Pa or 10 % greater than the maximum test pressure ( $P_{max}$ ), whichever is greater. The maximum pressure for each pulse should be reached in not less than 1 s and it should be maintained for not less than 3 s.

Apply test pressures, for not less than 10 s each, in the same sequence as will be used on the test specimen and measure the airflow into the test chamber at each test pressure.

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



Under negative test pressures, the measure of the air permeability of the test chamber is carried out as above.

Remove the airtight seal from the test specimen.

Ensure all openable joints are sealed with tape to make them airtight.

### 7.3.1 Positive pressure test: fixed elements

Apply 3 pulses of positive pressure equal to 500 Pa or 10 % greater than the maximum test pressure ( $P_{\max}$ ), whichever is greater. The maximum pressure for each pulse should be reached in not less than 1 s and it should be maintained for not less than 3 s.

Apply positive test pressures, for not less than 10 s each, in the appropriate sequence up to the selected maximum test pressure ( $P_{\max}$ ) and measure the airflow ( $Q_{fc}$ ) into the test chamber at each test pressure.

### 7.3.2 Negative pressure test: Fixed elements

A negative pressure test shall be performed.

Repeat the entire procedure according to 7.3.1 using negative test pressure.

Apply 3 pulses of negative pressure equal to 500 Pa or 10 % greater than the maximum test pressure ( $P_{\max}$ ), whichever is greater. The maximum pressure for each pulse should be reached in not less than 1 s and it should be maintained for not less than 3 s.

Apply negative test pressures, for not less than 10 s each, in the appropriate sequence up to the selected maximum test pressure ( $P_{\max}$ ) and measure the airflow ( $Q_{fc}$ ) into the test chamber at each test pressure.

### 7.3.3 Pressure test: Total specimen

Remove tape from openable joints.

Open and close all openable windows 5 times and finally secure them in the closed position.

Proceed as in 7.3.1 and 7.3.2 and measure the airflow ( $Q_{tc}$ ) into the test chamber at each test pressure.

### 7.3.4 Expression of results

Determine the air permeability ( $Q_f$ ) for the fixed panels and ( $Q_j$ ) for the openable joints, at each test pressure in cubic meters per hour ( $m^3/h$ ) as follows:

— For fixed panels  $Q_f = Q_{fc} - Q_c$

— For openable panels  $Q_j = Q_{tc} - Q_{fc}$

where

$Q_c$  is the airflow into the test chamber, measured with the specimen sealed airtight;

$Q_{fc}$  is the airflow into the test chamber, measured with only the openable joints sealed;

$Q_{tc}$  is the airflow into the test chamber, measured with the openable joints unsealed.

Determine the overall area ( $A$ ) of the test specimen and the total length ( $L_o$ ) of openable joints.

Calculate the air permeability per unit area of fixed panels ( $Q_t/A$ ) in  $m^3/m^2h$  at each test pressure and plot a graph of the results against the test pressures.

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Calculate:

- the air permeability per unit length of openable joint ( $Q_j/L_o$ ) in  $m^3/h.m$  at each test pressure and plot a graph of the results against the test pressures.

alternatively,

- the air permeability per unit length of fixed joint ( $Q_f/L_f$ ) in cubic metres per hour per metre ( $m^3/h.m$ ) at each test pressure and plot a graph of the results against the test pressures.

**8 Test report**

Prepare a report to positively identify the specimen/s and record all parameters checked.

The report shall include the following details:

- reference to this document;
- the name of the testing institute;
- persons or persons requesting the test;
- details of test specimen/s as follows:
  - type/s of construction;
  - profile references;
- origin of materials;
  - type/s of materials;
- date/s of manufacture (if known);
  - dimensioned drawings of specimen/s;
  - the results of the test, both at negative and positive pressure, in order not to lose the details of the two different pressure test results;
  - (only where the maximum test pressure  $P_{max}$  is  $> 600$  Pa) the final test pressure;
  - product designation from manufacturer's literature;
  - observations as to the condition of the specimen/s;
  - date of test;
  - date of calibration of test chamber and equipment;
  - date of report;
  - signature of person preparing the report.

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