SLOVENSKI STANDARD
SIST EN 12153:2023

01-oktober-2023

Nadomešča:
SIST EN 12153:2001

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: EN 12153:2023

ICS:

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

SIST EN 12153:2023   **en,fr,de**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12153

July 2023

ICS 91.060.10

Supersedes EN 12153:2000

English Version

Curtain walling - Air permeability - Test method

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

Vorhangfassaden - Luftdurchlässigkeit - Prüfverfahren

This European Standard was approved by CEN on 5 June 2023.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN 12153:2023 (E)

Contents

Page

iTeh STANDARD PREVIEW
(standards.iteh.ai)

2

European foreword

This document (EN 12153:2023) 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 January 2024, and conflicting national standards shall be withdrawn at the latest by January 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12153:2000.

The main changes compared to the previous edition are listed below:

— added a new test of air permeability at negative pressure and re-adapted the details of test report accordingly;

— editorial modifications to definitions, in order to make them compliant with the definitions of EN 12152.

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.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

EN 12153:2023 (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.

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

ISO and IEC maintain terminology 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)

3.2
positive pressure
when 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 construction of the curtain walling when subjected to air pressure

Note 1 to entry: 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 those between openable parts of the curtain wall (see Figure 3)

4

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

Note 1 to entry: Where a window is incorporated in the specimen it shall be considered as a panel for the purpose of the fixed joint calculation (see lines 1 in Figure 3).

3.7
openable joint length
perimeters of all moving casement or sash, 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)

Note 1 to entry: It shall be expressed in m^2.

Note 2 to entry: Profiles for mounting the specimen in the test stand shall not be considered.

4   Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply.

P_{max}	maximum positive and negative pressure [Pa]
Q_c	the airflow into the test chamber, measured with the specimen sealed airtight [m^3/h]
Q_{fc}	the airflow into the test chamber, measured with only the openable joints sealed [m^3/h]
Q_{tc}	the airflow into the test chamber, measured with the openable joints unsealed [m^3/h]
Q_f	the air permeability for the fixed panels [m^3/h]
Q_j	the air permeability for the openable joints [m^3/h]
Q_t	the air permeability for fixed panels at each test pressure [m^3/h]
A	the overall area of the test specimen
L_0	the total length of openable joints
L_f	length of fixed joint

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).

EN 12153:2023 (E)

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 ± 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 ± 5 %.

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

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 should be either representative according to EN 13830, or 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 document 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

7.3.1 General

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

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, according to Figure 3.

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

NOTE 1   If this is already known from previous tests, 7.3.2 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 (until a steady flow can be measured), 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.

NOTE 2   Under negative or positive test pressure, if the air leakage of the test chamber in combination with the test specimen is below the expected class, the air leakage of the test chamber Q_c can be neglected, in agreement between all parties.

Remove the airtight seal from the test specimen.

7.3.2 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 (until a steady flow can be measured) 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 Negative pressure test: fixed elements

A negative pressure test shall be performed.

Repeat the entire procedure according to 7.3.2 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 (until a steady flow can be measured), 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.

EN 12153:2023 (E)

7.3.4 Pressure test: openable elements

The test with openable joints not taped should not be carried out if openable elements have been already tested and classified accordingly to EN 1026 and EN 12207.

If the test with openable joints not taped is required, the following procedure shall be carried out.

Remove tape from openable joints.

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

Proceed as in 7.3.2 and 7.3.3 and measure the airflow (Q_{tc}) into the test chamber at each test pressure.

7.3.5 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 (m³ / 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 (see NOTE 2 in 7.3.1);

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.

NOTE   The air permeability of openable joints Q_j is not carried out if the test in 7.3.4 is not performed.

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 m³/m²·h at each test pressure and plot a graph of the results against the test pressures.

Calculate:

— the air permeability per unit length of openable joint (Q_j / L_o) in m³ / 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 (m³ / h·m) at each test pressure and plot a graph of the results against the test pressures.

The joint length between the specimen and the test chamber is not part of the fixed joint length.