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Obešene fasade – Neprepustnost za vodo – Laboratorijski preskus pri dinamičnem tlaku

Curtain walling – Watertightness – Laboratory test under dynamic condition of air pressure and water spray

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English Version

Curtain Walling - Watertightness - Laboratory test under dynamic condition of air pressure and water spray

Façades rideaux - Etanchéité à l'eau - Essai en laboratoire sous pression d'air dynamique et projection d'eau

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

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Foreword

This document (prEN 13050:2006) 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 in order to convert ENV 13050: 2000 into an EN by a CEN enquiry + formal vote.

This document will supersede ENV 13050:2000.

The contents of this draft is exactly the same that the contents of ENV 13050: 2000. Only the normative references and Bibliography were updated.

1 Scope

This standard defines an additional test method which may be used when assessing the watertightness of curtain walling, both its fixed and openable parts. It is a supplementary test, not required for classification purposes, and it should be used only when the project specifier has determined its necessity.

It describes how the outside face of a curtain walling specimen should be subjected to a continuous spray of water and a turbulent airflow, with continuous pulses of positive air pressure generated from within the chamber.

This standard applies to any curtain walling product as defined in EN 13830.

2 Normative references

The following referenced documents are indispensable for the application 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 12155, *Curtain walling - Test method to determine watertightness pressure*

prEN 13119:1997, *Curtain Walling - Terminology*

EN 13830, *Curtain Walling - Product standard*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in prEN 13119:1997 and the following apply.

3.1
test pressure
difference between the static air pressures on the outside and inside faces of the test specimen. It is expressed in Pascals (Pa).

3.2
positive test pressure
when the static air pressure is greater on the outside face of the test specimen than on the inside face.

3.3
watertightness
ability of the curtain walling specimen to resist water leakage.

3.4
water leakage
penetration of water that continuously or repeatedly wet parts of :

1. the inside face of the specimen.
2. any parts of the specimen not intended to be wetted as part of the system of water drainage to the outside.

4 Principle

The application of a constant and specified quantity of water in a spray combined with a specified turbulent airflow and continuous regular pulses of positive test pressure, on to the outside face of the specimen, while inspecting for water leakage.

5 Apparatus

5.1 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.

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 clause 6).

5.2 A means for applying controlled positive test pressures to the specimen arranged such that the air does not impinge directly on the specimen with any significant velocity.

5.3 A means by which rapidly controlled changes of test pressure may be produced within defined limits.

5.4 A means of measuring the applied test pressures within an accuracy of ±1 %.

5.5 An adjustable device for spraying water at working pressure range of 2 bar to 3 bar according to the manufacturers specification so that a constant and continuous film can be applied to the outside surface of the specimen.

The local mains water supply shall be an acceptable source providing it is clean enough to allow the spray nozzles to function properly throughout the test.

The water spraying device shall have nozzles spaced at not more than 700 mm centres on a regular grid and at a distance of 400 mm from the outside surface of the specimen (see figure 2).

The nozzles shall have the following features:

1. Circular full cone spray
2. Spray angle minimum 90° maximum 120°
3. working pressure range two to three bars according to the manufacturer's specification.

5.6 A means of measuring the total amount of water supplied within an accuracy of ± 10%.

5.7 A drain for the sprayed water which will not interfere with the drainage of the specimen frame.

5.8 A mobile wind generator for applying a controlled turbulent airflow to all points on the outside surface of the specimen.

The turbulent airflow shall be generated by a variable speed axial fan fixed to a 600 mm diameter rigid duct which directs the airflow around a 90° bend onto the outside surface of the specimen (see figure 3). The bend in the duct shall have a smaller radius of 300 mm ± 5 mm and the straight length of duct after the bend shall be 300 mm ± 10 mm.

The fan shall be capable of generating an airflow with the following features, measured 20 mm from the end of the duct and not more than 300 mm from its central horizontal axis:-

1. A minimum velocity of not less than 30 m/s along the central horizontal axis.
2. A minimum velocity of not less than 20 m/s over 75 % of the measurement area.
3. A minimum velocity of not less than 8 m/s at any point within the measurement area.

The axis of the airflow from the duct shall be horizontal and normal to the outside surface of the specimen with the end of the duct 650 mm, ± 50 mm, from the specimen.

The wind generator shall be mounted on a device that provides controlled movement in any direction in a plane parallel to the glazing or infill panels without regard for any small inclined sections of the specimen.

6 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 the 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 be not 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 5.1).

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 Specimen Preparation

No further preparations are necessary other than those already carried out for the preceding air permeability, watertightness and wind resistance tests.

8 Test Procedure

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

Calculate the maximum test pressure (P_{max}) and the minimum test pressure (P_{min}) from the actual, or intended maximum, design wind pressure (P_{design}) for the certain walling to comply with:

$P_{max} = 3\ P_{min} = 0{,}375 \times P_{design}$

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 shall be reached in not less than 1 second and it shall be maintained for not less than 3 seconds.

Operate the water sprays with 0 Pa test pressure and adjust the total flow to provide 2 l/m^2 per minute calculated from the area of the specimen under test.

After 15 minutes of spraying apply positive test pressures in continuous regular pulses with a maximum value equal to the maximum test pressure (P_{max}) and a minimum value equal to 0,33 x P_{max}. The duration of each pressure pulse shall be 5 seconds ± 1 second.

Position the wind generator with the central horizontal axis of the duct, midway between the outer two mullions nearest one edge of the specimen and 0,3 m above the bottom of the specimen and not less than 0,3 m or more than 0,9 from each mullion. Where the spacing between mullions is less than 0,6 m or more than 1,8 m, test each mullion separately with the wind generator positioned as for mullions at 0,6 m centres.

Start the fan and adjust the speed to produce an airflow with a velocity of 20 m/s when measured 20 mm from the end of the duct along the central horizontal axis.

Move the wind generator upwards at 2,5 m/min, ± 0,5 m/min, until the central horizontal axis from the duct is 0,3 m from the top of the specimen. Return the wind generator as rapidly as possible to the starting position near the bottom of the specimen. Make a second upward pass with the wind generator as before and return it to the starting position. Traverse the wind generator across the specimen so that the central horizontal axis of the duct is midway between the next pair of mullions and make two upward passes with the wind generator as before. Repeat this process until the whole of the specimen has been covered.

Constantly inspect the inside surfaces of the specimen for water leakage throughout the spraying period. Record the details of any water leaks that are observed and the total time from the start of spraying to the completion of the movement of the wind generator.

9 Test Results

If water leakage is observed, record the time since the start of spraying and the approximate position of the wind generator when any leak is first observed.

Identify the locations of all leaks on an elevational scaled drawing of the specimen.

Record the total time for which the specimen was sprayed with water, the maximum and minimum test pressures used for the pressure pulses and the total time for which they were applied.

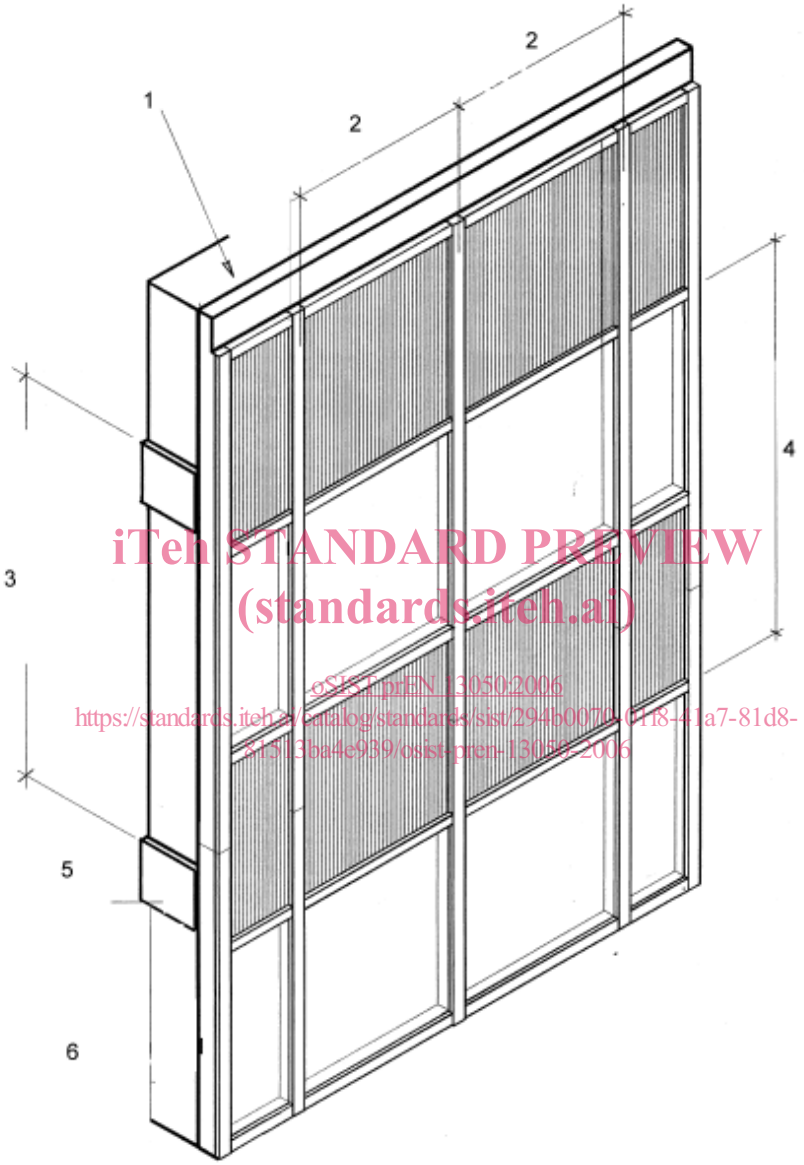
10 Test Report

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

The report shall include the following details:

- reference to this standard
- the name of the testing institute
- person(s) requesting the test
- details of test specimen as follows
    1 type/s of construction
    2 profile references
    3 origin of materials
    4 types of materials
    5 date/s of manufacture (if known)
- dimensioned drawings of the specimen
- results of the tests
- product designation form manufacturers literature
- date of the tests
- date of calibration of test chamber and equipment
- date of report

- signature of person preparing report



Key
1 Enclosed surround to test chamber
2 Typical module width
3 Typical storey height of structure
4 Typical storey height of curtain walling
5 Simulated floor structure
6 Test specimen sealed to chamber around total perimeter

Figure 1 - Example of test specimen built onto test chamber