SLOVENSKI STANDARD
SIST EN 1027:2001

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Nadomeġļa:
SIST EN 86:1996

Okna in vrata - Neprepustnost za vodo - Preskusna metoda

Windows and doors - Watertightness - Test method

Fenster und Türen - Schlagregendichtheit - Prüfverfahren

Fenetres et portes - Perméabilité a l'eau - Méthode d'essai

Ta slovenski standard je istoveten z: EN 1027:2000

ICS:

91.060.50 Vrata in okna Doors and windows

SIST EN 1027:2001 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1027

June 2000

ICS 91.060.50

Supersedes EN 86:1980

English version

Windows and doors - Watertightness - Test method

Fenêtres et portes - Perméabilité à l'eau - Méthode d'essai

Fenster und Türen - Schlagregendichtheit - Prüfverfahren

This European Standard was approved by CEN on 20 September 1999.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 1027:2000 E

Foreword

This European Standard 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of an identical text or by endorsement, at the latest by December 2000, and conflicting national standards shall be withdrawn at the latest by December 2000.

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

This standard will supersede EN 86 : 1980 "Methods of testing windows – Watertightness test under static pressure".

This standard is one of a series of standards for windows and doors.

1 Scope

This standard defines the conventional method to be used to determine the watertightness of completely assembled windows and doors of any materials. This test method is designed to take account of conditions in use, when the window or door is installed in accordance with the manufacturer's specification and the requirements of relevant European Standards and codes of practice.
This standard does not apply to the joints between the window or door frame and the building construction.

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.

prEN 12519 Doors and windows - Terminology

3 Definitions

For the purpose of this European Standard the definitions given in prEN 12519 and the following definitions apply :

3.1
test pressure
difference between the static air pressures on the external face and the internal face of the test specimen.

Test pressure is positive if the static air pressure on the external face is higher than that on the internal face.

3.2
watertightness
the ability of the closed and fastened test specimen to resist water penetration under the test conditions up to a pressure. (P_{max} = limit of the watertightness).

3.3
water penetration
continuous or repeated wetting of the internal surface of the test specimen or parts which are not designed to be wetted when water drains back to external face.

3.4
limit of watertightness
maximum test pressure P_{max} up to which the test specimen remains watertight under the test conditions for the specified time.

4 Principle

Constant spraying of a specified quantity of water onto the external surface of the test specimen while increments of positive test pressure are applied at regular intervals during which details are recorded of test pressure and location of water penetration.

5 Apparatus

5.1 A chamber with an open side to which the test specimen can be fitted. It shall be constructed so as to be able to withstand the test pressures without deflecting to an extent likely to influence the test results.

5.2 Means for applying controlled test pressure to test specimen.

5.3 Means of producing rapid changes in test pressure, controlled within defined limits.

5.4 Instrument suitable for measuring the quantity of water supplied within an accuracy of ± 10 %. If several rows of nozzles with different flows are included, at least two such instruments are needed.

5.5 Means of measuring the test pressure applied across the specimen, within an accuracy of ± 5 %.

5.6 A spraying system capable of applying a continuous regularly dispersed film of water, all over the surface likely to be wetted in real exposure conditions, by means of full circular cone nozzles with the floowing features :

a) angle of spay : $(120\,^{0}_{-10})°$
b) pressure working range : 2 bar to 3 bar according to manufacturer's specifications
c) nozzle rate : top row 2 l/min ± 0,2 l/min per nozzle
additional rows 1 l/min ± 0,1 l/min per nozzle
and 2 l/min ± 0,2 l/min per nozzle (see 6.2.4).

6 Preparation of test specimen

6.1 Set-up of the test specimen

The test specimen shall be fixed as intended for use in the works without any twists or bends which may influence the test results. The test specimen shall be fully operable.

The surround shall be prepared and installed so that any water penetration , including that through the frame joints, shall be readily detectable.

The test specimen shall be cleaned and surfaces dry.

Ventilation devices, if any, shall be taped over.

6.2 Set-up spraying system (see figure 1 to figure 3)

The location of the specimen in the intended works shall be taken into account when selecting the method of spraying (A or B).

A test shall be carried out using only one set up. A template is recommended to set up the spraying system.

6.2.1 Positioning of the line connecting the nozzle tips (the nozzle line)

The nozzle line shall be located not more than 150 mm above the topmost horizontal joint line of any moving frame or the glazing line of any fixed glazing, in order to provide complete wetting of the adjacent horizontal frame member(s).The nozzle line shall be located at a distance of (250^{+10}_{0}) mm from the external face of the specimen as defined by the outermost external joint plane of moving parts or the glazing plane of fixed parts.

6.2.2 Positioning relative to specimen width

Nozzles shall be spaced at 400 mm ± 10 mm along the axis of the spray bar and the nozzles shall be arranged in order that the lateral distance "c" between the outer edge of the surround and the outermost nozzles shall be greater than 50 mm but not exceeding 250 mm, see figure 3.

6.2.3 Direction of nozzle spray

The nozzle axis shall lie on a line $(24^{+2}_{0})°$ below the horizontal line for test according to Method 1A, and 84° ± 2° for test according to Method 1B, see figure 1.

6.2.4 Number of nozzle rows

6.2.4.1 For specimens with a height up to 2,5 m measured from the topmost horizontal joint line of any moving frame or glazing line of any fixed glazing to the next joint, see figure 1, a single row of nozzles shall be used, with each nozzle spraying, on average, 2 l/min for spraying Method 1A and spraying Method 1B.

NOTE The prescribed spraying rates above are appropriate for 2,5 m high test specimen. For smaller test specimen the nozzles spray water beyond the sill, hence the actual flow on the sprayed area is approximately

- 2 l/min/m^2 when test is carried out according to Method 1A
- 1 l/min/m^2 when test is carried out according to Method 1B

6.2.4.2 For specimens exceeding 2,5 m height, see figure 2, an upper row of nozzles shall be fixed as described in 6.2.4.1. Additional rows of nozzles shall be fixed at vertical intervals at 1,5 m (within a tolerance of ± 150 mm) below the top nozzle line. Where any horizontal projection occurs, these additional rows shall be installed at a level such that no water is sprayed upwards under the projection. The flow of each nozzle shall be, on average :

- 1 l/min for spraying Method 2A
- 2 l/min for spraying Method 2B

6.2.4.3 For specimens containing one or more horizontal waterbars which project more than 50 mm. See figure 5, an additional row of nozzles, as described in 6.2.4.2 shall be arranged for each waterbar as shown in figure 2.

6.3 Water characteristics

Water temperature shall be between 4 °C and 30 °C and the water shall be clean enough to ensure that all nozzles spray correctly.

7 Test procedure

7.1 Preliminaries

The test specimen shall be conditioned for at least 4 h within the range 10 °C to 30 °C and 25 % to 75 % RH immediately before testing.

Temperature shall be measured to within ± 3 °C and humidity to within ± 5 %. Atmospheric pressure shall be measured to within ± 1 kPa.

All the opening parts of the test specimen shall be opened and closed at least once before finally being secured in the closed position.

If an air permeability test has not been performed during the previous 24 h, three test pressure pulses shall be applied, the duration of increase in test pressure shall not be less than 1 s. Each pulse shall be maintained for at least 3 s. These pulses shall produce a test pressure 10 % greater than the maximum test pressure required for the test, without, however being less than 500 Pa.

7.2 Spraying phase

Spraying is applied first with the test pressure of 0 Pa for 15 min then with the test pressure increasing every 5 min, see figure 4. Overall duration is dependent on the watertightness of the test specimen. The duration of each pressure steps shall be within a tolerance of $^{+1}/_{0}$ min.The test pressure shall be applied in steps of 50 Pa up to 300 Pa and from 300 Pa in steps of 150 Pa.Immediately prior to testing the flow of each row of nozzles shall be adjusted according to 5.6.

7.3 Test results

Report the location and pressure at which any water penetrated the specimen and the time for which the maximum pressure was maintained before water penetrated.Mark this data on a drawing of the face view of the test specimen.

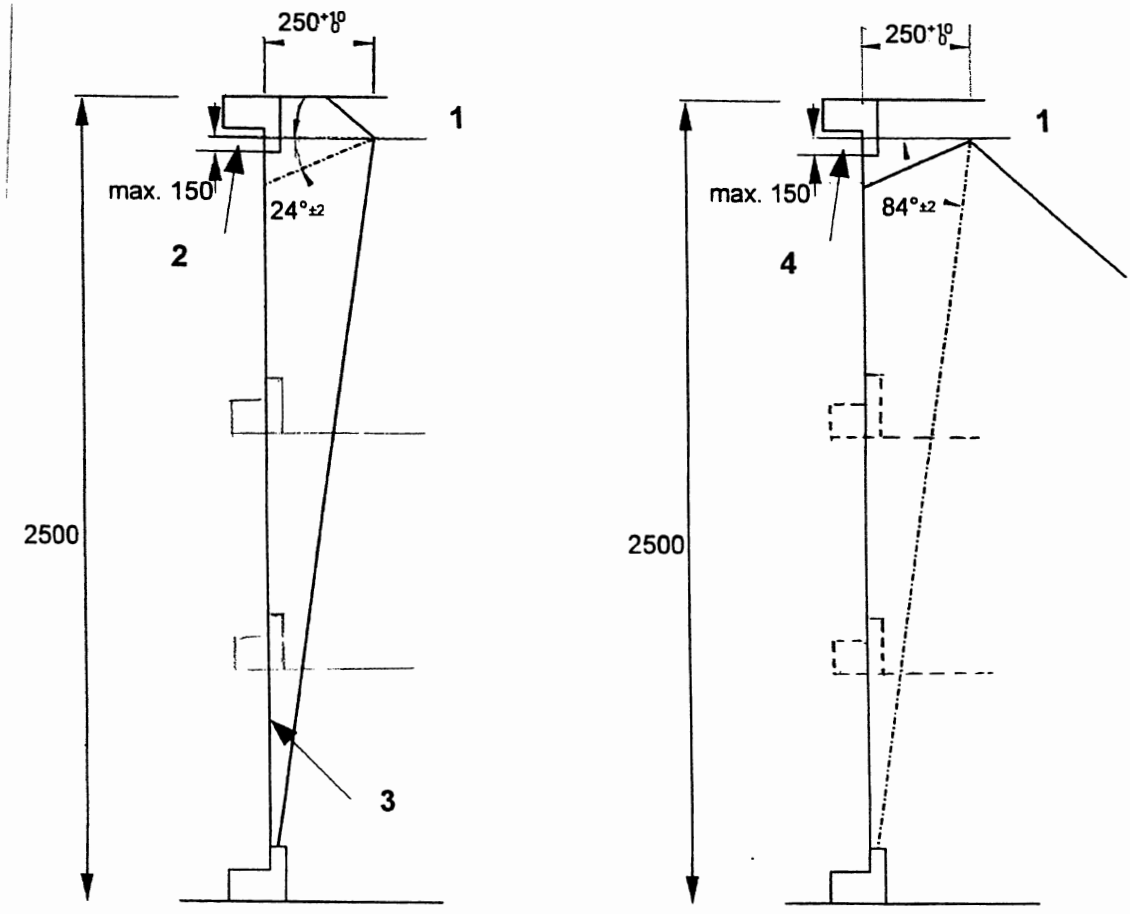
8 Test report

This shall state the devices used for the test and record on a drawing or a photograph of the test specimen the location of any significant water penetration observed.

The report shall contain as a minimum the following information :

- reference to this standard ;
- the name of the test institution ;
- date of the test ;
- all necessary references to identify the specimen and the method of selection of the test ;
- all relevant details concerning the dimensions of the specimen, its materials, design, construction and manufacture and its surface finish and fittings ;
- drawings of details of the specimen including cross section to a scale of 1:2 or larger ;
- presence of ventilation, type and condition (i.e. closed, taped over etc.);
- the spraying method ;
- test procedures, including storage and conditioning prior to test, and mounting the test specimen ready for test ;
- test climates used.

Dimensions in mm



Method 1A **Method 1B**

1 (2 ± 0,2) l/min/buse
2 Nozzle lip shall be above this level and spray the head member thoroughly
3 Outermost external joint plane or glazing plane
4 Nozzle lip shall be above this level

Figure 1 - Specimen not more than 2 500 mm