



SLOVENSKI STANDARD

SIST ENV 1187:2003/A1:2006

01-januar-2006

Preskusne metode za strehe, ki so požaru izpostavljene z zunanje strani

Test methods for external fire exposure to roofs

Prüfverfahren zur Beanspruchung von Bedachungen durch Feuer von außen

Méthodes d'essai pour l'exposition des toitures à un feu extérieur

Ta slovenski standard je istoveten z: **ENV 1187:2002/A1:2005**

ICS:

13.220.50	Požarna odpornost gradbenih materialov in elementov	Fire-resistance of building materials and elements
91.060.20	Strehe	Roofs

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en

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

ENV 1187:2002/A1

August 2005

ICS 13.220.50

English Version

Test methods for external fire exposure to roofs

Méthodes d'essai pour l'exposition des toitures à un feu
extérieur

Prüfverfahren zur Beanspruchung von Bedachungen durch
Feuer von außen

This amendment A1 modifies the European Standard ENV 1187:2002; it was approved by CEN on 25 May 2005.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant 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 amendment 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

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Foreword

This document (ENV 1187:2002/A1:2005) has been prepared by Technical Committee CEN/TC 127 "Fire safety in buildings", the secretariat of which is held by BSI.

This Amendment to the European Standard ENV 1187:2002 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2006, and conflicting national standards shall be withdrawn at the latest by February 2006.

ENV 1187:2002/A1 has been provided to comply with the EU Commission Decision to amend Decision 2001/671/EC, establishing a classification system for the external fire performance of roofs and roof coverings.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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ENV 1187:2002/A1:2005 (E)**1 Scope**

→ Amend clause to read:

This European Standard specifies four methods for determining the performance of roofs to external fire exposure. The four methods assess the performance of roofs under the following conditions:

Test 1 – with burning brands,

Test 2 – with burning brands and wind,

Test 3 – with burning brands, wind and supplementary radiant heat,

Test 4 – two stage test method incorporating burning brands, wind and supplementary radiant heat.

The tests assess the fire spread across the external surface of the roof, the fire spread within the roof (Tests 1, 2 and 3), the fire penetration (Tests 1, 3 and 4) and the production of flaming droplets or debris falling from the underside of the roof or from the exposed surface (Tests 1, 3 and 4).

Tests 2 and 3 are not applicable to geometrically irregular roofs or roof mounted appliances e.g. ventilators and roof lights.

NOTE The four tests listed above do not imply any ranking order. Each test stands on its own without the possibility to substitute or exchange one for another.

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3 Terms and definitions

→ Insert the following new sub-clause

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3.27**penetration by fire**

the appearance on the underside of the specimen of any flaming or glowing other than that of the test flame (Test 4 only), disregarding any test flame appearing through pre-existing openings in the test specimen

→ Insert the following new clause:

7 Test 4 – Two stage test method incorporating burning brands, wind and supplementary radiant heat**7.1 Test equipment****7.1.1 Brands**

The free standing test brand shall comprise a simulated town gas flame (55,2 % Hydrogen, 27,4 % Natural Gas, 17,4 % Nitrogen) (230 ± 10) mm long from a (9,5 ± 0,1) mm diameter orifice which shall be set prior to application on the test specimen.

7.1.2 Wind

Provision is made in the test to simulate the effect of a wind of 6,7 m/s by applying suction to the lower side of the roof specimen. Apparatus shall be provided, capable of reducing the pressure on the underside of the specimen by (15 ± 1) Pa below that on the upper side, for the duration of the test. The suction under the specimen shall be measured. An inclined tube manometer may be used for this purpose.

7.1.3 Radiant panel

A (915 ± 5) mm square radiant panel shall be provided, capable of being supported either at an angle of 45° or horizontal according to the test required, and shall comprise four (300 ± 5) mm square surface combustion panels with their centres arranged at the corners of a square of (480 ± 5) mm side (see Figure 14).

The radiation incident on the specimen is established with the radiant panel in the horizontal test position and the calibration element set at a perpendicular distance of (585 ± 5) mm from the radiant panels. The radiant panels shall be capable of providing an incident radiant heat flux distribution on the surface of the calibration element such that the heat flux at the four major axes, as shown in Figure 15, is $(12 \pm 1,5)$ kW/m².

A 25 mm diameter Schmidt Boelter heat flux meter with a range of $(0 - 50)$ kW/m² shall be used. The centre of the heat flux meter receiving radiation from the radiant panels shall be flat, circular and coated with a durable matt black finish. It shall be water cooled. Radiation shall not pass through any window before reaching the target. The instrument shall be robust, simple to set up and use, and stable in calibration.

The calibration of the heat flux meter shall be checked by comparison with two instruments of the same type as the working heat flux meter and of a similar range, held as references and not used for any other purpose. One of the reference standards shall be fully calibrated to yield the incident flux measured in an appropriate configuration at a competent laboratory at an interval of no more than 12 months.

7.1.4 Calibration element

The calibration element consists of a smooth, flat (20 ± 2) mm thick board of calcium silicate material having the dimensions (840 ± 10) mm square and a density of (870 ± 100) kg/m³.

7.1.5 Timing device

A timing device with an accuracy of ± 5 s over 24 h shall be used.

7.1.6 Specimen holder

A metal specimen cover with a mica observation window is fixed to the framing (Figure 14) and a material with a reaction to fire classification of A1 is laid around the sides of the specimen frame to provide an air seal when the specimen is placed in position. Any small holes around the edges of specimen and its frame shall be sealed with mortar (3:1 sand:cement mix).

7.2 Calibration

Each time the radiant panel is ignited, stable conditions shall be achieved and the radiant panel adjusted to obtain a total heat flux distribution on the surface of the calibration element as specified in 7.1.3. The minimum period of time of stabilization for calibration of the radiant panel is 60 min.

ENV 1187:2002/A1:2005 (E)**7.3 Test conditions**

Test specimens shall be mounted at an angle of 45° in all tests except where test specimens represent flat roofs (with a pitch up to 10°), in this case the specimens shall be tested horizontally.

7.4 Test specimen**7.4.1 Number of test specimens****7.4.1.1 Preliminary ignition test with burning brands (stage 1)**

- One specimen shall be tested.

7.4.1.2 Penetration test with burning brands, wind and supplementary radiant heat (stage 2)

- Three specimens shall be tested.

7.4.2 Construction of specimens

Each test shall be applied to a specimen of the roof structure (840 ± 10) mm square. The specimens shall be representative of the complete 'end use' roof construction including:

- the deck and supporting structure, and
- at least one specimen containing any joints used in each of the products to be tested.

Where necessary the specimen shall be made rigid by providing a frame at the boundaries of the specimen constructed from materials with a reaction to fire classification of A1. Any gaps between the specimen and the frame shall be sealed with mortar (3:1 sand:cement mix) to provide an air seal. The specimen and its frame shall also form an air seal with the specimen cover of the test apparatus, see Figure 16.

7.5 Conditioning

At the time of test, the specimens shall be conditioned to constant mass¹ in an atmosphere of (23 ± 2) °C and (50 ± 5) % relative humidity. The specimen shall be mounted in the test frame and tested as soon as possible after leaving the conditioning atmosphere. The time between leaving the conditioning atmosphere and testing shall not exceed 4 h.

7.6 Test environment

Testing shall be carried out in a draught free area. The ambient temperature within the laboratory shall be (20 ± 10) °C prior to the start of each fire test. If any measures are taken to remove products of combustion from the test laboratory, they shall be in operation during the calibration period and maintained during the test.

¹ Constant mass is considered to be reached when two successive weighing operations, carried out at an interval of 24 h, do not differ by more than 0,1 % of the mass of the specimen or 0,1 g, whichever is the greater.

7.7 Test procedure

7.7.1 Preliminary ignition test with burning brands (stage 1)

The test brand (see 7.1.1) shall be applied for 1 min starting at the centre of the upper surface of the specimen and directed up the slope with the nozzle resting on the centre line of the specimen and inclined at an angle of approximately 5° to its slope (or fall line). For specimens which are tested horizontally the direction of the flame will correspond to that used for a sloping roof as indicated by the arrow in Figure 14. For the purposes of this stage, the specimen shall be mounted in the specimen holder but not exposed to any radiant heat.

7.7.2 Penetration test with burning brands, wind and supplementary radiant heat (stage 2)

The specimen, after mounting for test, shall be brought, in not longer than 5 s, from a position at room temperature to a position where its upper surface is exposed to radiated heat. Immediately the specimen is exposed to the radiated heat, the pressure on the underside shall be reduced as detailed in 7.1.2.

At 5 min from the start of the test the burning brand shall be applied to the surface of the specimen, in the direction shown by the arrow in Figure 14 for 1 min, moving once up and once down the centre of the specimen at a rate of 0,29 m per 10 s.

The specimen shall remain exposed to the radiant panels for a period of 1 h unless the criteria set in 7.7.3 are exceeded.

7.7.3 End of test

The test shall be terminated and the fire extinguished if there is a risk to the safety of personnel or impending damage to equipment, or if any of the following occur.

- a) Preliminary ignition test with burning brands (stage 1)
- At 1 min, in the event of no ignition or penetration of the specimen occurs. If ignition occurs, the test is continued until all flaming ceases or the criteria in 7.8.2 are exceeded.
- b) Penetration test with burning brands, wind and supplementary radiant heat (stage 2)
- At 1 h, in the event that no penetration occurs, or earlier if penetration occurs as defined in 3.27.

7.8 Observations and measurements

7.8.1 General

During the test, the following parameters shall be observed, measured and recorded. Dimensions shall be expressed in mm.

Progress of all flaming, regardless of duration, shall be estimated with respect to the base of the flame, in contact with the exposed surface, and not with respect to the flame envelope.

7.8.2 Preliminary ignition test with burning brands (stage 1)

- Duration of flaming, if this has occurred and exceeds 5 min;
- Extent of flame spread in any direction and whether the maximum distance in any direction exceeds 381 mm; and