SLOVENSKI STANDARD
SIST EN 50266-1:2002

01-april-2002

Nadomešča:
SIST HD 405.3 S1:1999

Splošne metode za preskušanje kablov v požarnih razmerah - Preskus pri navpičnem širjenju ognja po navpično nameščenih žičnih kitah ali kablih - 1. del: Aparati

Common test methods for cables under fire conditions - Test for vertical flame spread of vertically-mounted bunched wires or cables - Part 1: Apparatus

Allgemeine Prüfverfahren für Kabel und isolierte Leitungen im Brandfall - Prüfung der senkrechten Flammenausbreitung von senkrecht angeordneten Bündeln von Kabeln und isolierten Leitungen - Teil 1: Prüfvorrichtung

Méthodes d'essai communes aux câbles soumis au feu - Essai de propagation verticale de la flamme des fils ou câbles en nappes en position verticale - Partie 1: Appareillage

Ta slovenski standard je istoveten z: EN 50266-1:2001

ICS:

13.220.40	Sposobnost vžiga in obnašanje materialov in proizvodov pri gorenju	Ignitability and burning behaviour of materials and products
29.060.20	Kabli	Cables

SIST EN 50266-1:2002 **en**

EUROPEAN STANDARD **EN 50266-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM February 2001

ICS 13.220.40; 29.020; 29.060.20 Supersedes HD 405.3 S1:1993

English version

Common test methods for cables under fire conditions - Test for vertical flame spread of vertically-mounted bunched wires or cables Part 1: Apparatus

Méthodes d'essai communes aux câbles soumis au feu - Essai de propagation verticale de la flamme des fils ou câbles en nappes en position verticale Partie 1: Appareillage

Allgemeine Prüfverfahren für Kabel und isolierte Leitungen im Brandfall - Prüfung der senkrechten Flammenausbreitung von senkrecht angeordneten Bündeln von Kabeln und isolierten Leitungen Teil 1: Prüfvorrichtung

This European Standard was approved by CENELEC on 2000-08-01. CENELEC 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 CENELEC 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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 50266-1:2001 E

Foreword

This European Standard was prepared by Working Group 10 of the Technical Committee CENELEC TC 20, Electric cables.

When used in conjunction with the relevant parts 2 of EN 50266 this European Standard supersedes HD 405.3 S1.

The description of the apparatus given in this part 1 updates that in HD 405.3 S1. All pre-existing categories of test from HD 405.3 S1 have been retained and updated in the different parts 2. A new category (category D) has been added to cater for testing at very low non-metallic volumes.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50266-1 on 2000-08-01.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2001-08-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2002-08-01

Annexes designated 'informative' are given for information only.
In this standard, annexes A and B are informative.

Contents

Introduction

Methods of test for flame spread characteristics for a single vertical insulated wire or cable are given in EN 50265, but it cannot be assumed that, because a cable or wire meets the requirements of that standard, a vertical bunch of similar cables or wires will behave in a similar manner. This is because flame spread along a vertical bunch of cables depends on a number of features, such as:

a) the volume of combustible material exposed to the fire and to any flame which may be produced by the combustion of the cables;
b) the geometrical configuration of the cables and their relationship to an enclosure;
c) the temperature at which it is possible to ignite the gases emitted from the cables;
d) the quantity of combustible gas released from the cables for a given temperature rise;
e) the volume of air passing through the cable installation;
f) the construction of the cable, e.g. armoured or unarmoured, multi or single core.

All of the foregoing assume that the cables are able to be ignited when involved in an external fire.

EN 50266 gives details, in various parts, of a test where a number of cables are bunched together to form various test sample installations. For easier use and differentiation of the apparatus and the various test categories, the parts are designated as follows:

Part 1	Apparatus
Part 2-1	Category A F/R
Part 2-2	Category A
Part 2-3	Category B
Part 2-4	Category C
Part 2-5	Category D

Parts from 2-1 onwards define the various categories and the relevant procedures. The categories are distinguished by test duration, the volume of non-metallic material of the test sample and the method of mounting the sample for the test. In all categories, cables having at least one conductor of cross-sectional area greater than 35 mm² are tested in a spaced configuration, whereas cables of conductor cross-sectional area of 35 mm² or smaller are tested in a touching configuration.

The categories are not necessarily related to different safety levels in actual cable installations. The actual installed configuration of the cables may be a major determinant in the level of flame spread occurring in an actual fire.

The method of mounting described as category A F/R (part 2-1) is intended for special cable designs used in particular installations.

Categories A, B, C and D (parts 2-2 to 2-5 respectively) are for general use where different non-metallic volumes are applicable.

Additional categories, especially to cover the use of small diameter communication cables in closely bunched configurations, will be further considered when more data is available.

1 Scope

EN 50266 specifies methods of test for the assessment of vertical flame spread of vertically-mounted bunched wires or cables, electrical or optical, under defined conditions.

NOTE For the purpose of this standard the term "electric wire or cable" covers all insulated metallic conductor cables used for the conveyance of energy or signals.

This part 1 details the apparatus and its arrangement and calibration.

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.

EN 60695-4 Fire hazard testing - Part 4: Terminology concerning fire tests.

3 Definition

For the purpose of EN 50266-1 the following definition applies. Definitions are taken from EN 60695-4.

3.1
ignition source
a source of energy that initiates combustion

4 Test environment

The test shall not be carried out if the external wind speed measured by an anemometer fitted on the top of the test rig is greater than 8 m/s and shall not be carried out if the temperature of the inside walls is below 5 °C or above 40 °C measured at a point approximately 1 500 mm above floor level, 50 mm from a side wall, and 1 000 mm from the door. The enclosure door shall be closed throughout the test.

5 Test apparatus

The test apparatus consists of the following:

5.1 Test chamber

The test rig (Figure 1) shall comprise a vertical test chamber having a width of (1 000 ± 100) mm, a depth of (2 000 ± 100) mm and a height of (4 000 ± 100) mm; the floor of the chamber shall be raised above ground level. The test chamber shall be nominally airtight along its sides, air being admitted at the base of the test chamber through an aperture of (800 ± 20) mm x (400 ± 10) mm situated (150 ± 10) mm from the front wall of the test chamber (see Figure 1).

An outlet (300 ± 30) mm x (1 000 ± 100) mm shall be made at the rear edge of the top of the test chamber. The back and sides of the test chamber shall be thermally insulated to give a coefficient of heat transfer of approximately 0,7 $W.m^{-2}.K^{-1}$. For example, a steel plate 1,5 mm to 2,0 mm thick covered with 65 mm of mineral wool with a suitable external cladding is satisfactory (see Figure 2). The distance between the ladder and the rear wall of the chamber is (150 ± 10) mm, and between the bottom rung of the ladder and the floor (400 ± 5) mm. The clearance between the lowest point of the test piece and the floor is approximately 100 mm (see Figure 3).

5.2 Air supply

A means of supplying a controlled air flow through the chamber shall be fitted.

NOTE 1 It is recommended that the air should be blown into the test chamber, via the air inlet, using a suitable fan.

Prior to burner ignition, the air flow shall be adjusted to a rate of (5 000 ± 500) litre/min at a constant controlled temperature of (20 ± 10)°C and at atmospheric pressure and measured at the inlet side before the test commences. This air flow shall be maintained throughout the test until cable burning or glowing has ceased or for a maximum time of one hour from completion of the test flame application period, after which period the flame or glowing shall be extinguished.

NOTE 2 In order to remove noxious gases it is recommended to maintain the air flow for some minutes after the end of test, before entering the test chamber.

5.3 Ladder types

There are two types of tubular steel ladder: a standard ladder of (500 ± 5) mm width and a wide ladder of (800 ± 10) mm width. Details of the types of ladder are given in Figures 4a and 4b.

5.4 Effluent cleaning attachment

Legal requirements may make it necessary for equipment for collecting and washing the effluent to be fitted to the test chamber. This equipment shall not cause a change in the air flow rate through the test chamber.

6 Ignition source

6.1 Type

As required by the test procedure the ignition source shall be one or two ribbon-type propane gas burners complete with venturi mixer, and their own set of flow meters. The propane gas shall be technical grade propane of nominal 95 % purity. The flame-producing surface of the burner(s) shall consist of a flat metal plate through which 242 holes of 1,32 mm in diameter are drilled on 3,2 mm centres in three staggered rows of 81, 80 and 81 holes each to form an array having the nominal dimensions 257 mm x 4,5 mm. As the burner plate may be drilled without the use of a drilling jig, the spacing of the holes may vary slightly. Additionally, a row of small holes may be milled on each side of the burner plate to serve as pilot holes with the function of keeping the flame burning.

The burners are shown in Figures 5a and 5b, and the placement of the holes in Figure 6.

NOTE 1 To ensure reproducibility between results from different testing stations, a burner, which is readily available, is recommended for use. For details, see annex A.

Each burner shall be individually fitted with an accurate means of controlling the propane gas and air input flow rates, either by means of a rotameter-type flowmeter or mass flowmeter.

NOTE 2 Mass flowmeters are recommended for ease of use.

Figure 7 shows an example of a rotameter-type system.

Safety Note: The following precautions are recommended to ensure safe operation of the ignition source:

- a flame failure protection device should be used;
- the gas supply system should be equipped with flashback arrestors;
- safe sequencing of the propane and air supply should be employed during ignition and extinguishing.

The calibration of the propane gas and air rotameter-type flowmeters shall be checked after installation to ensure that the pipework and venturi mixer have not affected the calibration.

Corrections for the variations in temperature and pressure from that specified on the propane gas and air rotameter-type flowmeters should be applied when necessary, see annex B.

Propane gas and air rotameter-type flow meters shall be calibrated according to the following reference conditions.

Reference temperature and pressure are 20 °C and one bar (100 kPa).

For the purpose of this test the air shall have a dew-point not higher than 0 °C.

The flow rates at reference conditions (1 bar and 20 °C) for the test shall be as follows:

Air (77,7 ± 4,8) litre/minute
Propane (13,5 ± 0,5) litre/minute

to provide a nominal (73,7 ± 1,68) x 10^6 J/h ((70 000 ± 1 600) Btu/h))[1)] to each burner.

NOTE 3 The net heat of combustion is used to calculate the propane flow rate.

6.2 Positioning

For the test the burner shall be arranged horizontally at a distance of (75 ± 5) mm from the front surface of the cable sample and (600 ± 5) mm above the floor of the test chamber and approximately symmetrical with the axis of the ladder. The point of application of the burner flame shall lie in the centre between two cross-bars on the ladder and at least 500 mm above the lower end of the sample (see Figure 3 and Figure 5a).

Adjustment of air and gas flows prior to the test may be carried out away from the test position.

Where two burners are used in combination with the wide ladder they shall be arranged so as to be approximately symmetrical with the axis of the ladder, as shown in Figure 5b. The burner system shall be positioned such that the centre line of the burner system is approximately coincident with the centre of the ladder.

[1)] This is also equivalent to (20,5 ± 0,5) kW