SLOVENSKI STANDARD
SIST EN 50200:2016

01-marec-2016

Nadomešča:
SIST EN 50200:2006

Metoda preskušanja požarne odpornosti nezaščitenih malih kablov v zasilnih tokokrogih

Method of test for resistance to fire of unprotected small cables for use in emergency circuits

Prüfung des Isolationserhaltes im Brandfall von Kabeln mit kleinen Durchmessern für die Verwendung in Notstromkreisen bei ungeschützter Verlegung

Méthode d'essai de résistance au feu des câbles de petites dimensions sans protection pour utilisation dans les circuits de secours

Ta slovenski standard je istoveten z: **EN 50200:2015**

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 50200:2016 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50200

December 2015

ICS 13.220.40; 29.035.20

Supersedes EN 50200:2006

English Version

Method of test for resistance to fire of unprotected small cables for use in emergency circuits

Méthode d'essai de la résistance au feu des câbles de petites dimensions sans protection pour utilisation dans les circuits de secours

Prüfung des Isolationserhaltes im Brandfall von Kabeln mit kleinen Durchmessern für die Verwendung in Notstromkreisen bei ungeschützter Verlegung

This European Standard was approved by CENELEC on 2015-09-14. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 50200:2015 E

Contents

Page

Figures

European foreword

This document (EN 50200:2015) has been prepared by Working Group 10 of CLC/TC 20 “Electric cables”.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2016-09-14
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2018-09-14

This document supersedes EN 50200:2006.

The main changes compared to EN 50200:2006 are as follows (minor changes are not listed):

– detailed procedures for metallic data cables and for optical fibre cables have been removed as they are now given in the relevant standards of CLC/TC 46X and CLC/TC 86A. These standards refer to EN 50200 for the basic test method;

– recasting and extension of the existing Annex D into two new Annexes, Annex B “Field of direct application and extended application of test results (Electric power and control cables with rated voltage up to and including 600 V/1 000 V) and Annex D “Information regarding classification”.

The cable is tested in a representative installed condition, under conditions of minimum bending radius, and the test is based upon a constant temperature attack at a minimum test temperature of 830 °C. This is typical of the gas temperature reached after 30 min exposure to the time/temperature conditions prescribed in EN 1363-1.

The test method in this document includes exposure to fire with mechanical shock under specified conditions and satisfies the requirements of Mandate M/117 for the PH classification. This European Standard also includes (Annex E) a means of applying a water spray to the cable during the test, which is not required under Mandate M/117.

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

1 Scope

This European Standard specifies the test method for cables designed to have intrinsic resistance to fire and intended for use as emergency circuits for alarm, lighting and communication purposes.

This European Standard is applicable to cables for emergency circuits of rated voltage not exceeding 600 V/1 000 V, including those of rated voltage below 80 V and optical fibre cables.

This European Standard includes details for the specific point of failure, continuity checking arrangement, test sample, test procedure and test report relevant to electric power and control cables with rated voltage up to and including 600 V/1 000 V. Details for the specific point of failure, continuity checking arrangement, test sample, test procedure and test report relevant to copper data and telecom cables and optical cables are given in the relevant standards of CLC/TC 46X and CLC/TC 86A.

The test method is limited to cables with an overall diameter not exceeding 20 mm.

The test method is based on the direct impingement of flame from a propane burner giving a constant temperature attack of a notional 842 °C. It is intended to be used for cables for emergency circuits suitable for alarm, emergency lighting and communication.

NOTE When the test method is used in support of EN 13501–3, it only applies to cables of less than 20 mm diameter, and, for metallic conductor cables, to those with conductor sizes up to and including 2,5 mm^2. For optical cables, only the less than 20 mm diameter limit applies.

This European Standard includes (Annex B) the field of direct application and rules for extended application of test results (EXAP). Details regarding classification using data from this test are given in EN 13501-3 [1]. Information regarding classification is given in Annex D.

This European Standard also includes informative guidance (Annex E) on a means of applying a water spray to the cable during the test. Such a requirement may be a feature of particular product standards.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13501-3, *Fire classification of construction products and building elements - Part 3: Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers*

EN 60584-1, *Thermocouples - Part 1: EMF specifications and tolerances (IEC 60584-1)*

EN 60695-4, *Fire hazard testing - Part 4: Terminology concerning fire tests for electrotechnical products (IEC 60695-4)*

EN ISO 13943, *Fire safety - Vocabulary (ISO 13943)*

1) At the time of finalizing EN 50200, an amendment to EN 13501-3:2005+A1:2009 concerning cables is under consideration in CEN/TC 127.

IEC 60269-3:2010 and IEC 60269–3:2010/A1:2013, *Low-voltage fuses – Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications) - Examples of standardized systems of fuses A to F*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 13943 and EN 60695-4 and the following apply.

3.1
draught-free environment
space in which the results of tests are not significantly affected by the local air speed

4 Test environment

The test shall be carried out in a draught-free environment within a suitable chamber, of minimum volume 20 m^3, with facilities for disposing of any noxious gases resulting from the burning. Sufficient ventilation shall be available to sustain the flame for the duration of the test. Air inlets and the exhaust chimney should be located in such a way that the burner flame remains stable during the verification procedure and test. If necessary, the burner shall be shielded from any draughts by the use of draught shields. Windows may be installed in the walls of the chamber in order to observe the behaviour of the cable during the test. Fume exhaust should be achieved by means of natural draught through a chimney located at least 1 m from the burner. A damper may be used for adjustment of ventilation conditions.

The same ventilation and shielding conditions shall be used in the chamber during both the verification and cable test procedures.

The chamber and test apparatus shall be at (25 ± 15) °C at the start of each test.

NOTE The test given in this European Standard may involve the use of dangerous voltages and temperatures. Suitable precautions should be taken against shock, burning, fire and explosion risks that may be involved and against any noxious fumes that may be produced.

5 Test apparatus

5.1 Test equipment

The test equipment shall consist of the following:

a) a test wall, on to which the cable is mounted, comprising a board manufactured from heat resisting non-combustible material suitable for the temperatures involved fastened to steel supports and mounted on a rigid support as described in 5.2;

b) a continuity checking arrangement as described in 5.3;

c) a source of heat comprising a horizontally mounted ribbon burner as described in 5.4;

d) a shock producing device as described in 5.5;

e) a test wall equipped with thermocouples for verification of the source of heat as described in 6.1;

f) fuses as described in 5.7.

A general arrangement of the test equipment is shown in Figure 1, Figure 2 and Figure 3.

5.2 Test wall and mounting

The test wall shall consist of a board of heat resisting, non-combustible and non-metallic material fastened rigidly to two horizontal steel supports, one at the top of the board and the other at the bottom. Vertical supports may also be used. The board shall be (900 ± 100) mm long, (300 ± 50) mm high and (10 ± 2) mm thick, and the total mass of the wall (i.e. board and steel supports) shall be (10 ± 0,5) kg. Ballast, if required, shall be placed inside the steel supports.

Guidance on the choice of suitable material for the wall is given in Annex A.

Boards should not be re-used if they show significant damage. In case of dispute, a new board shall be used for each test.

NOTE 1 Supports made from square section steel tube approximately 25 mm x 25 mm and approximately 1 m long have been found to be suitable.

NOTE 2 The top support should be fastened to the board so that its upper face is slightly above the upper edge of the board, so that the shock producing device impacts on the support and not the board.

Each horizontal support shall have a mounting hole at each end, not more than 100 mm from the edge of the board, the exact position and diameter being determined by the particular supporting bush and supporting framework used. The test wall shall be fastened to a rigid support by four bonded rubber bushes of hardness 50-60 Shore A fitted between the horizontal steel supports of the wall and the support framework, as shown in Figure 1 and Figure 2, so as to allow movement under impact.

NOTE 3 A typical rubber bush which has been found to be suitable is shown in Figure 4.

In order to check the mounting of the wall, the static deflection following application of a load to the centre of the upper support of the wall shall periodically be measured.

The values of load and deflection shall comply with the following:

– load: (25 ± 0,2) kg;

– deflection: (1,5 ± 0,3) mm.

5.3 Continuity checking arrangement for electric power and control cables with rated voltage up to and including 600 V/1 000 V

During the test a current for continuity checking shall be passed through all conductors of the test sample. This shall be provided by a three phase star connected or single phase transformer(s) of sufficient capacity to maintain the test voltage up to the maximum leakage current allowable.

NOTE 1 Due note should be taken of the fuse characteristics when determining the power rating of the transformer.

This current is achieved by connecting, at the other end of the sample, a suitable load and indicating device (e.g. lamp) to each conductor, or group of conductors.

NOTE 2 A current of 0,25 A at the test voltage, through each conductor or group of conductors, has been found to be suitable.

5.4 Source of heat

5.4.1 Burner

The source of heat shall be a ribbon type propane gas burner with a nominal burner face length of 500 mm with a Venturi mixer. The nominal burner face width shall be 10 mm. The face of the burner shall have three staggered rows of drilled holes, nominally 1,32 mm in diameter and drilled at centres 3,2 mm from one another, as shown in Figure 5.

Guidance on the choice of recommended burner systems is given in Annex A.

NOTE 1 A centre-feed burner is recommended.

NOTE 2 A row of small holes milled on each side of the burner plate, to serve as pilot holes for keeping the flame burning, is permitted.

5.4.2 Flow meters and flow rates

Mass flow meters / controllers shall be used as the means of controlling accurately the input flow rates of fuel and air to the burner.

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

The mass flow rates used for the test shall be as follows:

– propane: (160 ± 6) mg/s;

NOTE 1 This is approximately equivalent to a volume flow rate of (5,0 ± 0,2) l/min at reference conditions (1 bar and 20 °C).

– air: (1 600 ± 80) mg/s.

NOTE 2 This is approximately equivalent to a volume flow rate of (80 ± 4) l/min at reference conditions (1 bar and 20 °C).

5.4.3 Verification

The burner and control system shall be subject to verification following the procedure given in Clause 6.

5.5 Shock producing device

The shock producing device shall be a mild steel round bar (25 ± 0,1) mm in diameter and (600 ± 5) mm long. The bar shall be freely pivoted about an axis parallel to the test wall, which shall be in the same horizontal plane as, and (200 ± 5) mm away from, the upper edge of the wall. The axis shall divide the bar into two unequal lengths, the longer length being (400 ± 5) mm which shall impact the wall. The bar shall drop under its own weight from an angle of $(60\ ^{+5}_{0})°$ to the horizontal to strike the upper steel support of the wall at its midpoint as shown in Figure 1 and Figure 3.

5.6 Positioning of source of heat

The burner face shall be positioned in the test chamber such that it is at least 200 mm above the floor of the chamber or any solid mounting block, and at least 500 mm from any chamber wall.

By reference to the wall the burner shall be positioned centrally at a horizontal distance of (40 ± 2) mm from the burner face to the test wall as shown in Figure 2 and Figure 3.

NOTE The burner should be rigidly fixed to the framework during testing so as to prevent movement relative to the test sample.

5.7 Fuses

Fuses used in the test procedures in Clause 8 shall comply with IEC 60269-3 Fuse System A-D Type DII, 2A. Alternatively, a circuit breaker with equivalent characteristics may be used.

Where a circuit breaker is used, its equivalent characteristics shall be demonstrated by reference to the characteristic curve shown in Annex C.

The fuse shall be the reference method in the case of dispute.

6 Verification procedure for source of heat

6.1 Measuring equipment

The flame temperature shall be measured using two 1,5 mm mineral insulated, stainless steel sheathed thermocouples Type K to EN 60584-1, mounted on the test wall as shown in Figure 7. The thermocouple tips shall be (10 ± 0,5) mm in front of the test wall. The horizontal line of the thermocouples shall be (100 ± 10) mm above the bottom of the wall. The wall shall consist of a board of heat-resistant, non-combustible and non-metallic material (900 ± 100) mm long, (300 ± 50) mm high and (10 ± 2) mm thick.

6.2 Procedure

Position the burner (40 ± 2) mm horizontally from the wall and (65 ± 10) mm vertically below the centre line of the thermocouple as shown in Figure 3.

Ignite the burner and adjust the gas and air supplies to those given in 5.4.2.

Monitor the temperature as recorded by the thermocouples over a period of 10 min to ensure conditions are stable.

6.3 Evaluation

The verification procedure shall be considered satisfied if

a) the arithmetic mean of the averaged readings for each of the two thermocouples over the 10 min period falls within the requirement of $(830\ ^{+40}_{0})$ °C and

b) the difference of the averaged readings for each of the two thermocouples over the 10 min period does not exceed 40 °C.

At least one measurement shall be made on each thermocouple every 30 s in order to obtain the average.

NOTE The actual method of obtaining the average thermocouple reading over the period is not specified but it is recommended that a recorder with averaging facilities be used in order to damp the variability caused by point measurement.

6.4 Further verification

If the verification is not successful, the flow rates shall be altered within the tolerances given in 5.4.2 and/or distances altered within the tolerances given in 6.2 and a further verification carried out.

If no successful verification can be achieved within the tolerances given, then the burner system shall be considered as incapable of providing the source of heat required by this European Standard.

6.5 Verification report

The position established for successful verification and flow rates used shall be recorded (see 8.1).

7 Test sample (Electric power and control cables with rated voltage up to and including 600 V/1 000 V)

7.1 Sample preparation

The sample to be tested shall be a piece of cable not less than 1 200 mm long with approximately 100 mm of sheath and outer coverings removed at each end. At each end of the test sample, each conductor shall be suitably prepared for electrical connections, and, if there is more than one conductor, the exposed conductors shall be spread apart to avoid contact with each other.

7.2 Sample mounting

The test sample shall be bent to form an approximate "U" shape. The internal radius of each bend shall be the manufacturer's declared minimum bending radius in normal use and the overall distance between the vertical portions of the cable shall be (475 ± 10) mm as shown in Figure 8.

The test sample shall be mounted centrally on the wall using copper P clips. The clips, which shall be earthed, shall support the cable at either end of the radiused section and in the centre as shown in Figure 8. The type of clips used shall be detailed in the Test Report.

By agreement between the user and manufacturer of the cable alternative clips may be used for the testing of multicore cable, but in this case the test shall only be considered valid for cable installed with such clips.

8 Cable test procedure (Electric power and control cables with rated voltage up to and including 600 V/1 000 V)

8.1 General

The test procedure shall be carried out using the apparatus detailed in Clause 5.

Position the burner (40 ± 2) mm horizontally from the wall, and at the same vertical distance below the bottom line of the cable as determined in the verification procedure for the distance between burner and thermocouple centre lines.

8.2 Electrical connections

At the transformer end of the sample, earth the neutral conductor, if present, and any protective conductor. Any metal screens, drain wire or metallic layer shall be interconnected and earthed. Connect the transformer(s) to the conductors, excluding any conductor which is specifically identified as intended for use as a neutral or a protective conductor, as shown in the circuit diagram (Figure 9).