SLOVENSKI STANDARD
SIST EN 1366-11:2018+A1:2022

01-februar-2022

Nadomešča:
SIST EN 1366-11:2018

Preskusi požarne odpornosti servisnih inštalacij - 11. del: Požarni zaščitni sistem za kabelske sisteme in pripadajoče dele (vključuje dopolnilo A1)

Fire resistance tests for service installations - Part 11: Fire protective systems for cable systems and associated components

Feuerwiderstandsprüfungen für Installationen - Teil 11: Brandschutzsysteme für Kabelanlagen und zugehörige Komponenten

Essais de résistance au feu des installations de service - Partie 11 : Systèmes de protection incendie pour les systèmes de câbles et composants associés

Ta slovenski standard je istoveten z: EN 1366-11:2018+A1:2021

ICS:

13.220.50	Požarna odpornost gradbenih materialov in elementov	Fire-resistance of building materials and elements
29.060.20	Kabli	Cables
91.140.50	Sistemi za oskrbo z elektriko	Electricity supply systems

SIST EN 1366-11:2018+A1:2022 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1366-11:2018+A1

December 2021

ICS 13.220.50; 29.060.20; 91.140.50

Supersedes EN 1366-11:2018

English Version

Fire resistance tests for service installations - Part 11: Fire protective systems for cable systems and associated components

Essais de résistance au feu des installations de service - Partie 11 : Systèmes de protection incendie pour les systèmes de câbles et composants associés

Feuerwiderstandsprüfungen für Installationen - Teil 11: Brandschutzsysteme für Kabelanlagen und zugehörige Komponenten

This European Standard was approved by CEN on 9 April 2017 and includes Amendment 1 approved by CEN on 22 November 2021.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

		Page
European foreword		4
Introduction		5
1	Scope	6
2	Normative references	6
3	Terms and definitions	7
4	Test equipment	9
4.1	Furnace	9
5	Test conditions	9
5.1	Heating conditions	9
5.2	Pressure conditions	9
6	Test specimen	9
6.1	Dimensions	9
6.2	Number of tests	9
6.3	Design	9
7	Installation of test specimen	10
7.1	Fire protective system with cables	10
7.2	Fire protective systems with busbars	12
7.3	Special cases	12
8	Conditioning	13
9	Application of instrumentation	13
9.1	Furnace thermocouples (plate thermocouples)	13
9.2	Preheating inside the fire protective system	13
9.3	Additional thermocouples	13
10	Test procedure	14
10.1	General	14
10.2	Power supply	14
10.2.1	General	14
10.2.2	Continuity and short circuit checking arrangement for power cables	14
10.2.3	Continuity and short circuit checking arrangement for signal/control cables	15
10.2.4	Continuity and short circuit checking arrangement for busbars	16
11	Performance criteria	16
12	Test report	16
13	Field of direct application of test results	17
13.1	Types of cables	17
13.2	Application of test results of four-sided, three sided or two-sided fire protective systems	17
13.3	Assembly of fire protective system	19
13.4	Fixing of fire protective system to wall and ceiling	20
13.5	Types of cable management systems / busbars and load inside the fire protective system	21

13.6 Types of suspension device 21
13.7 Adjoining construction 22
13.8 Dimension of fire protective systems 23
13.9 Orientation of fire protective systems for cables and busbars 23
13.10 Special cases 23
13.10.1 Ventilation devices and inspection hatches 23
13.10.2 Removable lid 23
13.10.3 Penetrating systems 23
Annex A (informative) **Thermocouples inside the fire protective systems 31**
Annex B (informative) **Preheating 32**
Annex C (informative) **Performance criteria for communication/data cables 33**
Bibliography 34

European foreword

This document (EN 1366-11:2018+A1:2021) has been prepared by Technical Committee CEN/TC 127, "Fire safety in buildings" the secretariat of which is held by BSI.

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 June 2022 and conflicting national standards shall be withdrawn at the latest by June 2022.

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

This document supersedes EN 1366-11:2018.

This document includes Amendment 1 approved by CEN on 22 November 2021.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ▌A1⟩ ⟨A1▐.

The EN 1366 series, *Fire resistance tests for service installations* consists of the following:

Part 1: Ducts

Part 2: Fire dampers

Part 3: Penetration seals

Part 4: Linear joint seals

Part 5: Service ducts and shafts

Part 6: Raised access floors and hollow floors

Part 7: Closures for conveyors and trackbound transportation systems

Part 8: Smoke extraction ducts

Part 9: Single compartment smoke extraction ducts

Part 10: Smoke control dampers

Part 11: Fire protective systems for cable systems and associated components

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The purpose of this test is to evaluate the ability of the protective system to allow cables and components of their installation (connectors, glands, junctions, mountings, etc.) to maintain during a defined time a reliable function whilst exposed to fire. The purpose of this test is to verify compliance with requirements regarding the circuit integrity of systems for example as those for firefighting lifts, pressure boosters, emergency lighting, fire alarm systems etc.

The fire exposure conditions and general arrangement in this European Standard are similar to those given in EN 50577, developed by CLC/TC 20, and prCLC/TR 50658 under development by CLC/TC 213. Each of these standards has been developed under a Mode 4 co-operation between CEN TC 127, CLC/TC 213 and CLC/TC 20.

CAUTION: The attention of all persons concerned with managing and carrying out this fire resistance test is drawn to the fact that fire testing may be hazardous and that there is a possibility that toxic and/or harmful smoke and gases may be evolved during the test. Mechanical and operational hazards may also arise during the construction of the test elements or structures, their testing and disposal of test residues.

An assessment of all potential hazards and risks to health should be made and safety precautions should be identified and provided. Written safety instructions should be issued. Appropriate training should be given to relevant personnel. Laboratory personnel should ensure that they follow written safety instructions at all times.

1 Scope

This European Standard describes the method to evaluate the performance of protective systems for electrical cable and busbar systems in order to maintain the circuit integrity under fire conditions to classify the protective system according to EN 13501-3 for the P classification. The test examines the behaviour of cable protection systems exposed to fire from outside. The tests specified in this standard are not aimed for assessing the performance of the fire protective system and the penetration seal for maintaining the requirements of the penetrated wall or ceiling (classification E / I).

This method is very different to EN 50200 for the PH classification and also to IEC 60331-11, IEC 60331-21, IEC 60331-23, and IEC 60331-25, which are not designed for fire protective systems for electrical cable systems.

This standard should be used in conjunction with EN 1363-1.

The test results apply to fire protective systems for electrical cable systems rated for voltages up to 1 kV.

The test procedure should also be used to determine the performance of protective systems for use with data and optical cables, however, verification procedures for such cables are still under development. Proposals are given in Annex C.

The protective system may include ventilation devices, inspection hatches, fixed or removable lids etc.

The tests specified in this standard are not aimed for assessing the performance of sprayed or painted coatings (e.g. intumescent or ablative coating, plastic film, epoxy resin) and similar protective layers (e.g. wrap, bandage) applied directly on the cables or bus bars as fire protective system. Also, cables and bus bars with intrinsic resistance to fire, and without fire protective systems around, are excluded (see CENELEC standard EN 50577).

This test method is not applicable for cabinets for electrical accessory containing bus systems, relays or similar.

A1 The cables identified in this document are for testing only. It is not intended that they shall be used in protective systems installed in buildings. A1

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 1363-1, *Fire resistance tests - Part 1: General Requirements*

EN 1363-2, *Fire resistance tests - Part 2: Alternative and additional procedures*

A1 EN 1364-1, *Fire resistance tests for non-loadbearing elements — Part 1: Walls*

EN 13501-2, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services* A1

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 50288-7, *Multi-element metallic cables used in analogue and digital communication and control - Part 7: Sectional specification for instrumentation and control cables*

EN 50525-2-11, *Electric cables - Low voltage energy cables of rated voltages up to and including 450/750 V (Uo/U) - Part 2-11: Cables for general applications - Flexible cables with thermoplastic PVC insulation*

EN 60269-1, *Low-voltage fuses - Part 1: General requirements (IEC 60269-1)*

EN 61537, *Cable management - Cable tray systems and cable ladder systems (IEC 61537)*

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

HD 603 S1, *Distribution cables of rated voltage 0,6/1 kV*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1363-1, EN ISO 13943, and the following, apply.

3.1
fire protective system
heat-insulating assembly of flexible or rigid materials inside which cables or cable management systems or busbars are arranged

Note 1 to entry: The protective system may be ducts, shafts, conduits, trunkings, or similar systems.

3.2
duct
horizontal self-supporting enclosure made of rigid boards or slabs for combustible or non-combustible cables or busbars with or without suspension device

Note 1 to entry: Jacket enclosures are included.

3.3
range of ducts
ducts with different cross sectional area and with the same thickness of the protective system for a given fire rating

3.4
shaft
vertical self-supporting enclosure made of rigid boards or slabs for combustible or non-combustible cables or busbars with or without suspension device

Note 1 to entry: Jacket enclosures are included.

3.5
suspension device
mechanical support provided in the form of clips, ties, hangers, ladder racks or trays, or any device designed to carry the load of the cables and the protective system

3.6
conductor
part of a cable which has the specific function of carrying current

3.7
busbar
low-impedance conductor to which several electric circuits can be connected at separate points

3.8
busbar trunking system
factory-built assembly in the form of a conductor system comprising busbars which are spaced and supported by insulating material in a duct, trough or similar enclosure

3.9
connecting element
element such as sleeves and junction boxes

3.10
cable management system
assembly including different system components intended for the accommodation of insulated conductors, cables and possibly other electrical equipment in electrical and / or communication systems

Note 1 to entry: Examples of cable management system are conduit system, cable ductory system, cable trunking system, cable tray system, cable ladder system, cable cleat, cable tie.

3.11
maintenance of circuit integrity
maintenance, the purpose of which is to maintain circuit integrity if there is no short circuit or circuit interruption in the cable system when exposed to fire from outside

3.12
circuit integrity
ability of an electric cable to continue to operate in a designated manner whilst subjected to a specific source of heat for a specified period of time under specific conditions

3.13
power cable
cable of voltages up to 0,6/1 kV comprising one or more insulated conductor(s), together with any coverings and protective layers, used for the transmission or supply of electrical energy

3.14
signal cable
control cable
cable comprising insulated conductor(s), together with any coverings and protective layers, used for the transmission of control, measuring and indication signals in electric installations

3.15
communication cable
data cable
cable of suitably insulated coaxial conductors or twisted pairs of insulated conductors fabricated to meet transmission, mechanical and environmental requirement, and sufficient to allow conveyance of information between two points with the minimum of radiation

3.16
optical fibre cable
cable comprising one or more optical fibres or fibre bundles inside a common covering designed to protect them against mechanical stresses and other environmental influences while retaining the transmission quality of the fibres

3.17
supporting construction
wall, partition or floor which the duct/shaft passes through in the test

4 Test equipment

4.1 Furnace

The test shall be carried out using the equipment and procedures in accordance with EN 1363-1, and if appropriate EN 1363-2, modified if necessary as described in this standard. The furnace shall be at least width x length = 2 000 mm x 3 000 mm in size (internal dimensions).

5 Test conditions

5.1 Heating conditions

The heating conditions and the furnace atmosphere shall conform to those given in EN 1363-1.

5.2 Pressure conditions

The furnace pressure shall be controlled to a minimum of 20 Pa throughout the test at the top of the uppermost fire protective systems. Fire protective systems shall only be in the zone where the positive pressure exceeds 10 Pa (a minimum pressure of 10 Pa shall be maintained at the lowest point of the lowest fire protective system).

6 Test specimen

6.1 Dimensions

The specimen shall be installed horizontally in the furnace for the test. The exposed length of the fire protective system shall be at least 3 000 mm, but shall not be shorter than 2 × span of the suspension device + minimum of 250 mm at each end.

6.2 Number of tests

Fire protective systems shall be tested with the maximum and minimum dimensions (width and height or diameter) for each range, specified by the sponsor. Any size of the fire protective system may be tested as required by the sponsor.

6.3 Design

6.3.1 Outside the furnace, the fire protective system shall be closed by inserting an appropriate mineral wool plate into the end of the fire protective system, fixed in place with an appropriate adhesive (e.g. sodium silicate adhesive) or by fixing boards of the same material as for the fire protective system.

6.3.2 The test configuration shall include at least one joint inside the furnace. If such a joint is intended in practice to be independent from the suspension device the joint shall be located at approximately mid-span between two suspension devices.

7 Installation of test specimen

7.1 Fire protective system with cables

7.1.1 The fire protective system (e.g. duct) shall pass straight through the furnace. The length outside the furnace shall not exceed 200 mm. Between furnace wall and fire protective system, there shall be a minimum gap of 4 cm which shall be closed by mineral wool. The fire protective system shall not be fixed to the furnace walls at the penetration of the fire protective system through the walls. The fire protective system shall be suspended on devices attached to the ceiling or wall of the furnace as shown in Figure 1; the spacing of devices shall be specified by the sponsor (see Clause 13). The suspension devices shall be welded or screwed. Other kinds of fixings are not allowed.

Three-sided and two-sided fire protective systems may also be fixed to the wall/ceiling or be suspended by devices attached to the wall/ceiling (see Figure 1).

The suspension devices shall be made of steel and be sized such that the calculated stresses do not exceed the values given in the Table 3 in 13.6.

7.1.2 Fire protective systems shall be exposed to fire on all four sides (configuration a) or h) in Figure 1). The distance between 2 adjacent fire protective systems, and the distance between the top of the horizontal four-sided fire protective system and the furnace ceiling, shall be at least 500 mm. Similarly, there shall be a clearance of at least 500 mm between the sides of the fire protective system and the furnace walls.

To cover the field of direct application (see Clause 13) the fire protective system shall additionally be tested to fire exposure on three sides if requested by the sponsor. The distance between fire protective systems, and the distance between the top of the horizontal three sided (see Figure 1e)) fire protective system and the furnace ceiling, shall be at least 500 mm.

The minimum distance from the burner to the lowest part of the fire protective system shall be 500 mm (see Figure 4).

7.1.3 Depending on the desired field of application / cable types there are [A1⟩ five possibilities ⟨A1] for the test configuration

Configuration 1: To represent all types of power cables (rated voltage 300/500 V) for an operating voltage up to 230/400 V (three-phase AC) and signal/control cables for an operating voltage up to 110 V (AC), the following cable types shall be laid in the fire protective system:

[A1⟩ — 2 power cables of type H05VV-F with PVC insulation 70 °C, dimension 4 or 5 × 1,5 mm^2 (with PVC insulation and PVC sheath), according to EN 50525-2-11; ⟨A1]

[A1⟩ — 1 power cable with PVC insulation 70 °C of type E-YY-J or NYY-J or identical according to HD 603 S1, dimension 4 or 5 × 16 mm^2 (with PVC insulation and PVC sheath); ⟨A1]

— 2 signal-/control cables with PVC insulation for 70°C (one screened and unscreened), dimensions 2 × 2 × 0,8 mm or 1 × 4 × 0,8 mm according to EN 50288-7.

Configuration 2: To represent all types of power cables (rated voltage 450/750 V up to 0,6/1 kV) for an operating voltage up to 400/690 V (Three-phase AC) and signal/control cables