



SLOVENSKI STANDARD

oSIST prEN 1366-11:2011

01-februar-2011

Preskusi požarne odpornosti inštalacij - 11. del: Požarni zaščitni sistem za kabelske sisteme in pripadajoče dele

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

Feuerwiderstandsprüfungen für Installationen - Teil 11: Funktionserhalt von elektrischen Kabelanlagen mit Brandschutzsystem

Essais de résistance au feu des installations de service - Partie 11: Performance des systèmes de protection des chemins de câbles électriques

<https://standards.iteh.ai/catalog/standards/sist/ea38608f-5e6a-464e-91b3-7bda28e02767/osist-pr-en-1366-11-2011>

Ta slovenski standard je istoveten z: prEN 1366-11

ICS:

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

oSIST prEN 1366-11:2011

en,fr,de

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 1366-11:2011](https://standards.iteh.ai/catalog/standards/sist/ea38608f-5e6a-464e-91b3-7bda28e02767/osist-pren-1366-11-2011)

<https://standards.iteh.ai/catalog/standards/sist/ea38608f-5e6a-464e-91b3-7bda28e02767/osist-pren-1366-11-2011>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 1366-11

November 2010

ICS 13.220.50

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: Performance des systèmes de protection des
chemins de câbles électriques

Feuerwiderstandsprüfungen für Installationen - Teil 11:
Funktionserhalt von elektrischen Kabelanlagen mit
Brandschutzsystem

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 127.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	6
4 Test equipment	7
5 Test conditions	7
5.1 Heating conditions.....	7
5.2 Pressure conditions	7
6 Test specimen	7
7 Installation of test specimen	8
7.1 Fire protective system with cables	8
7.2 Fire protective systems with bus bars	9
7.3 Special cases	9
8 Conditioning.....	9
9 Application of instrumentation.....	9
9.1 Furnace thermocouples (plate thermocouples)	9
9.2 Thermocouples inside the fire protective system	10
9.3 Heating cable inside the fire protective system	10
10 Test procedure	10
10.1 General.....	10
10.2 Power supply.....	10
10.2.1 General.....	10
10.2.2 Continuity and short circuit checking arrangement for power cables	11
10.2.3 Continuity and short circuit checking arrangement for signal/control cables	11
10.2.4 Continuity and short circuit checking arrangement for bus bars	11
10.2.5 Performance checking for data and optical fibre cables.....	11
11 Performance criteria.....	12
12 Test report	12
13 Field of direct application of test results	12
13.1 Types of cables	12
13.2 Application of test results of four-sided or three sided fire protective systems	12
13.3 Assembly of fire protective system	13
13.4 Fixing of fire protective system to wall and ceiling	13
13.5 Types of cable management system and load inside the fire protective system.....	13
13.6 Types of suspension device.....	14
13.7 Supporting construction.....	15
13.8 Dimension of fire protective systems.....	15
13.9 Orientation of fire protective systems	15
13.10 Special cases	15
13.10.1 Ventilation devices and inspection hatches	15
13.10.2 Removable lid.....	15
13.10.3 Penetrating systems.....	16

Foreword

This document (prEN 1366-11:2010) has been prepared by Technical Committee CEN/TC 127 “Fire safety in buildings”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

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

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

- *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 (in course of preparation)*
- *Part 10: Smoke control dampers*
- *Part 11: Fire Protection system for essential services (in course of preparation)*

STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/ea38608f-5e6a-464e-91b3-feda28e02767/osist-pren-1366-11-2011>

Introduction

The purpose of this test is to evaluate the ability of the protective system to allow cables plus components of their installation (connectors, glands, junctions, mountings, etc.) to maintain during a defined time a reliable function whilst exposed to fire. Therefore cables are used with worst case behaviour in fire (high temperature) as indicator that the fire protective system gives the necessary protection during a given time period.

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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 1366-11:2011](https://standards.iteh.ai/catalog/standards/sist/ea38608f-5e6a-464e-91b3-7bda28e02767/osist-pren-1366-11-2011)

<https://standards.iteh.ai/catalog/standards/sist/ea38608f-5e6a-464e-91b3-7bda28e02767/osist-pren-1366-11-2011>

1 Scope

This part of EN 1366 describes a method to evaluate the maintenance of circuit integrity of electrical cable systems and associated components (connectors, glands, junctions, mountings, etc.) under fire conditions to classify the protective system according to EN 13501-3. The test examines the behaviour of cable protection systems exposed to fire from outside.

This standard is 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.

NOTE This test procedure may be used to determine the functionality for optical and data cables in case of fire but this does not form part of the classification procedure.

The protection 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 are excluded.

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

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

ITeH STANDARD PREVIEW
(standards.iteh.ai)

2 Normative references

oSIST prEN 1366-11:2011

<https://standards.iteh.ai/catalog/standards/sist/ea38608f-5e6a-464e-91b3-38c2770d0000/en-1366-11-2010>

This 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 titles of the publications are listed below. For dated references, subsequent amendments to or revisions of any of these publications apply to this standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 1363-1:1999, *Fire resistance tests — Part 1: General requirements*

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

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 — 2-11 Cables for general applications — Flexible cables with thermoplastic PVC insulation*

EN 60269-3-1, *Low-voltage fuses — Part 3-1: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications) — Sections I to IV: Examples of types of standardized fuses*

EN ISO 13943:2010, *Fire safety — Vocabulary (ISO 13943:2008)*

IEC 61537, *Cable tray systems and cable ladder systems for cable management*

prEN 1366-11:2010 (E)

HD 603-3, *Distribution cables of rated voltage 0.6/1 kV — Part 3 : PVC insulated cables — Unarmoured*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1363-1:1999 and EN ISO 13943:2010, together with the following, apply.

3.1**Fire Protective System**

heat-insulating assembly of flexible or rigid materials inside which cables or cable systems are arranged

NOTE The protective system may be ducts, shafts, conduits, trunkings, jacket enclosures or similar systems.

3.2**duct**

horizontal self-supporting enclosure made of rigid boards or slabs for combustible or non-combustible cables or bus bars with or without suspension device

NOTE Jacket enclosures are included.

3.3**range of ducts**

ducts with one thickness of the protective system for one fire rating

3.4**shaft**

vertical self-supporting enclosure made of rigid boards or slabs for combustible or non-combustible cables or bus bars with or without suspension device

NOTE Jacket enclosures are included.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
oSIST prEN 1366-11:2011
<https://standards.iteh.ai/catalog/standards/sist/ea38608f-5e6a-464e-91b3-7bda28e02767/osist-pren-1366-11-2011>

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**

material allowing the flow of electric current

3.7**bus bar**

rigid metallic conductor

3.8**connecting element**

e.g. sleeve or junction box

3.9**cable system**

cable system includes power cables, data / signal cables and bus bars, including the associated ducts or conduits, fasteners, supports and fixings

3.10**maintenance of circuit integrity**

circuit integrity is deemed to be maintained if there is no short circuit or circuit interruption in the cable system when exposed to fire from outside

3.11**power cable**

cable of voltages up to 0,6/1 kV

3.12**signal/control cable**

multi-element metallic cable used in analogue and digital communication and control systems

3.13**supporting construction**

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

3.14**jacket enclosure**

special kind of duct or shaft for protective systems consisting of an assembly of flexible materials (e.g. wraps, bandage), inside which cable trays or ladders are arranged with cables or cabling systems

3.15**penetrating system**

installation (e.g. pipes, cable) crossing the fire protective system (passing through from one side to another)

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 $b \times l = 2\,000\text{ mm} \times 3\,000\text{ mm}$ in size (internal dimensions).

<https://standards.iteh.ai/catalog/standards/sist/ea38608f-5e6a-464e-91b3-7bda28e02767/osist-pren-1366-11-2011>

5 Test conditions**5.1 Heating conditions**

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

For each fire protective system there shall be one plate thermocouples at each side in mid height for at least two positions within the length of the furnace. The plate thermocouples side A shall be faced to the furnace wall. The distance from the specimen shall be 100 mm. The maximum distance (length) between the thermocouples shall be 1.5 m. The maximum distance between the furnace wall and the thermocouples shall be 0.8 m in the direction of the axis.

For the position of the thermocouples see figures 1 and 2.

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 system 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

The specimen shall be installed horizontally in the furnace for the test. The exposed length of the duct shall be at least 3000 mm, but shall not be shorter than $2 \times \text{span of the suspension device} + \text{minimum of } 250\text{ mm}$ at each end.

prEN 1366-11:2010 (E)

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

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.

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.

7 Installation of test specimen

7.1 Fire protective system with cables

7.1.1 The fire protective system (duct) shall pass straight through the furnace. The length outside the furnace shall not exceed 200 mm. Between furnace wall and fire protective system a minimum gap of 4 cm shall be closed by mineral wool with a low density. The fire protective system shall not be fixed to the furnace walls. The fire protective system shall be suspended on devices attached to the ceiling of the furnace; the spacing of devices shall be specified by the sponsor (see chapter 13).

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 13.6.1.

7.1.2 Fire protective systems shall be exposed to fire on all four sides. Fire protective systems may also be tested to fire exposure on three sides to cover the direct field of application (see chapter 13). The distance between 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. The minimum distance from the burner to the lowest part of the fire protective system shall be 500 mm (see figure 1 and 2).

7.1.3 To represent the types of cables encountered in practice, the following cable types shall be laid in the fire protective system:

- 2 power cables of type H05 VV-F, dimension 4 or 5 x 1.5 mm², according to EN 50525-2-11
- 2 signal- and control cables with PVC insulation, dimensions 2 x 2 x 0.8 according to EN 50288-7
- 1 power cable with PVC insulation and PVC sheath, dimension 4 or 5 x 16 mm², according to HD 603-3

The cables shall be fixed either directly to the bottom of the fire protective system, or to a tray or ladder according to IEC 61537 laid in the fire protective system, using metal clips or suitable plastic fastener spaced at one meter intervals.

Special cables required by the sponsor including optical or data cables may also be tested. Than the field of application is limited, see section 13.1.

7.1.4 Fire protective systems shall be subjected to a uniformly distributed equivalent load specified by the sponsor. The equivalent load shall be taken as the difference between the load specified by the sponsor and the load exerted by the tested cables during the test.

Equivalent loads shall be applied on the bottom of the fire protective system if no cable tray is used or on the tray / ladder as line loads of a length of maximum 400 mm. Steel chains may be used as an alternative. The loads shall remain fixed in the same position throughout fire exposure.

7.2 Fire protective systems with bus bars

7.2.1 Bus bars used for testing shall have the largest and smallest cross sections specified by the sponsor. For each shape of bus bar and each conductor type (copper, aluminium) the maximum number of conductors and the maximum cross section area of the conductors shall be tested. If both orientations of the conductors (vertical and horizontal) are to be covered, both orientations shall be tested.

7.2.2 Connecting elements (e.g. sleeves and junction boxes) shall be included in the test, since they are part of the system and will be exposed to very high temperatures.

The fire protective system with bus bars shall be installed in the same way as fire protective systems for cables.

7.3 Special cases

7.3.1 If it is required by the sponsor to test a cable penetrating the wall of the fire protective system an additional power cable with PVC insulation and PVC sheath, dimension 4 or 5 x 16 mm², according to HD 603-3 shall be included in the test specimen with the smallest cross section. The exposed length of the unprotected cable outside the fire protective system shall be at least 300 mm. If another cable is tested than the field of application is limited, see section 13.1.

7.3.2 If it is intended to penetrate the fire protective system with any systems like earthing systems, pipes or something else as defined by the sponsor, they shall be tested in the test specimen (fire protective system) with the smallest cross section. The exposed length of the unprotected system outside the fire protective system shall be at least 300 mm.

7.3.3 If it is required by the sponsor ventilation devices in fire protective systems shall be included in the test and located (side, bottom or top of fire protective system) as specified by the sponsor. It has to be located between two suspension devices. For protection systems incorporating natural ventilation devices, they shall be left open at the beginning of the test.

7.3.4 If it is required by the sponsor inspection hatches in fire protective systems shall be included in the test and located (side, bottom or top of fire protective system) as specified by the sponsor. It has to be located between two suspension devices.

7.3.5 If it is intended to have a fire protective system with bending, the test arrangement of the largest test specimen shall include minimum one bend of 90°. All specimens including this bend shall be mounted with the suspension or fixing devices as used in practice.

7.3.6 If it is intended to have a fire protective system with branch, a T-piece shall be included in the largest test specimen with a length of 500 mm. All specimens including this branch shall be mounted with the suspension or fixing devices as used in practice.

8 Conditioning

Conditioning of the test construction shall be in accordance with EN 1363-1.

9 Application of instrumentation

9.1 Furnace thermocouples (plate thermocouples)

Plate thermocouples shall be provided in accordance with EN 1363-1.

The side "A" of the plate thermocouples shall be orientated to the wall of the furnace (see also Figures 1 and 2).