



# SLOVENSKI STANDARD

## SIST EN 1366-2:2015

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Nadomešča:  
SIST EN 1366-2:1999

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### Preskusi požarne odpornosti servisnih inštalacij - 2. del: Požarne lopute

Fire resistance tests for service installations - Part 2: Fire dampers

Feuerwiderstandsprüfungen für Installationen - Teil 2: Brandschutzklappen

Essais de résistance au feu des installations techniques - Partie 2: Clapet résistant au feu

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#### **ICS:**

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

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## Fire resistance tests for service installations - Part 2: Fire dampers

Essais de résistance au feu des installations techniques -  
Partie 2 : Clapets résistant au feu

Feuerwiderstandsprüfungen für Installationen - Teil 2:  
Brandschutzklappen

This European Standard was approved by CEN on 3 April 2015.

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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
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**EN 1366-2:2015 (E)****Foreword**

This document (EN 1366-2:2015) 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of an identical text or by endorsement, at the latest by December 2015, and conflicting national standards shall be withdrawn at the latest by December 2015.

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

This document supersedes EN 1366-2:1999.

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: Ventilation ducts;*
- *Part 2: Fire dampers* (the present document);
- *Part 3: Penetration seals;*
- *Part 4: Linear joint seals;*
- *Part 5: Service ducts and shafts;*
- *Part 6: Raised access and hollow core floors;*
- *Part 7: Conveyor systems and their closures;*
- *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* (currently at Enquiry stage);
- *Part 12: Non-mechanical fire barrier for ventilation ductwork.*

This standard underwent a formal review process during 2009-2011. Various comments were considered and these were only considered when they added clarity to the procedure. No changes have been made that make historical data redundant. This was deliberately avoided where it was thought to be occurring. If there are some issues with this, consideration should be given to the spirit of the original test combined with the better clarity now given.

The following technical changes were made in this new edition:

- Changes include the fact that symmetry as a concept has been removed. This does not negate original tests, but may now mean that some additional tests are needed.
- The figures have been clarified to show some more detail. Testing away from a wall or floor now has an equal distance between damper and the supporting construction. In this instance, historical data is not negated but any testing done after the publication of this standard needs to be done to the new dimensions.

- Further information is given on thermocouple placement and the concepts of  $T_3$ ,  $T_4$ , etc. have been added to make it clear which thermocouples should be considered and when. The description of details on additional thermocouples around discontinuities has been added for clarification.
- Additional information has been added to show the details for testing fire dampers to demonstrate insulation characteristics where a fire damper is to be used un-ducted, ducted on one side or ducted on both sides.

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

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**EN 1366-2:2015 (E)****Introduction**

The purpose of the test is to evaluate the ability of a fire damper to prevent fire and smoke spreading from one fire compartment to another through the air ductwork system which may penetrate fire separating walls and floors.

The fire damper is attached (directly or remotely via a section of ducting), to a fire separating element in a manner representative of practice. Tests are performed starting with the fire damper in the open position to expose the temperature sensing element of the fire damper to furnace conditions.

Temperature and integrity measurements are carried out in various parts of the test construction during the test. The leakage of the fire damper system is measured (continuously during the test) by direct flow measurements whilst maintaining a constant pressure differential across the closed fire damper of 300 Pa. The leakage of the fire damper in the closed position is also measured at ambient temperature, when a reduced leakage classification needs to be achieved.

An additional test to prove insulation characteristics may be needed if the damper needs to be used un-ducted on one side or on both sides. This test is not needed where such evidence is not required, or if insulation is not a requirement of performance, in the specific application.

**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 specifies a method for determining the fire resistance of fire dampers installed in fire separating elements designed to withstand heat and the passage of fire, smoke and gases at high temperature. This European Standard is used in conjunction with EN 1363-1.

This standard is not suitable for testing fire dampers in suspended ceilings.

This standard is not suitable for testing non-mechanical fire dampers (see EN 1366-12).

## 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 1363-1:2012, *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 ISO 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 1: General principles and requirements (ISO 5167-1)*

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

ISO 5221, *Air distribution and air diffusion — Rules to methods of measuring air flow rate in an air handling duct*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1363-1:2012 and EN ISO 13943 and the following apply.

### 3.1

#### **fire damper**

device for use in heating, ventilation and air-conditioning (HVAC) systems at fire boundaries to maintain compartmentation and protect means of escape in case of fire

Note 1 to entry: It may have reduced smoke leakage characteristics.

### 3.2

#### **insulated fire damper**

fire damper which satisfies both the integrity and insulation criteria for the anticipated fire resistance period

### 3.3

#### **uninsulated fire damper**

fire damper which satisfies the integrity criteria for the anticipated fire resistance period, but which does not provide a long enough insulation period to gain an EI classification

**EN 1366-2:2015 (E)****3.4****cone valve fire damper**

fire damper consisting of a cone which closes into a profiled ring in case of fire and which normally has only one duct connection

**3.5****fire damper actuating mechanism**

mechanism, integral or directly associated with the fire damper which, when initiated causes the damper to change from the "open" to the "closed" position

**3.6****temperature sensing element**

device that senses temperature, that causes the thermal release mechanism to activate at a defined elevated temperature.

**3.7****test specimen**

fire damper, connecting frame and (if applicable) the perimeter penetration sealing system

**3.8****thermal release mechanism**

mechanism, containing/linked to the sensing element, that causes the open damper to release and close in response to elevated temperature

**3.9****connecting duct**

duct section between the fire damper or supporting construction and the measuring station

**3.10****test construction**

complete assembly of the test specimen, the connecting duct and the supporting construction

**3.11****measuring station**

equipment installed between the connecting duct and the exhaust equipment to determine the volume flow rate of gases passing through the fire damper under test

**3.12****exhaust equipment**

equipment consisting of a fan and balancing or dilution dampers (if any), to apply and maintain the underpressure in the connecting duct

**4 Test equipment****4.1 General**

In addition to the test equipment specified in EN 1363-1, and if applicable, EN 1363-2, the following is required. Examples of test configurations are shown in Figures 1 and 2.

**4.2 Connecting duct**

The connecting duct shall be of all welded construction fabricated from  $(1,5 \pm 0,1)$  mm thick steel of the same size (width x height or diameter) as the fire damper being tested. The duct shall have a length of two times the diagonal dimension of the damper up to a maximum of 2 m. Where a damper that has a short spigot such that connection to the connecting duct is difficult, this spigot shall be extended by 500 mm using material of the same type and thickness of the spigot in order to provide a secure air-tight connection without unduly stiffening the damper. This

extended spigot shall be all welded the same as the connecting duct. The length of the connecting duct shall then be reduced by 500 mm.

For the test for the cone valve fire damper that is to be undertaken with underpressure on the cone side, the connecting duct shall be securely connected to the frame outside the cone.

The connecting duct may be provided with a gas tight observation window.

Care should be taken in the event of testing to Figure 4, to select a method of connecting the damper to the ductwork to ensure that accurate leakage is recorded.

### 4.3 Volume flow measuring station

This shall consist of a venturi, orifice plate, or other suitable device and (where necessary) an air flow straightener, installed in straight lengths of pipe, all sized to EN ISO 5167-1 and ISO 5221. It shall be installed between the connecting duct and the exhaust fan to determine the volume flow rate of gases passing through the fire damper under test. The measuring device shall be capable of measuring to an accuracy of  $\pm 5\%$ . Regardless of whether vertical or horizontal fire dampers are being tested, the volume flow measuring station shall always be used in a horizontal orientation.

### 4.4 Condensing unit

Where materials used in the construction of a fire damper may generate quantities of steam during the fire test, a condensing unit having provision for drainage shall be installed between the fire damper and the flow measuring device. When using the condensing device, the temperature recorded by the thermocouple positioned downstream of the flow measuring device described in 4.3 shall not exceed 40 °C.

### 4.5 Gas temperature measuring devices

These shall be positioned adjacent to the flow measuring device. A suitable device is a 1,5 mm diameter sheathed thermocouple orientated vertically with its measuring junction located at the centre line of the measuring duct and at a distance equal to twice the diameter of the measuring duct downstream from the flow measuring device. A similar thermocouple may be located at the exit from the connecting duct plenum for information purposes only (see Figure 1).

### 4.6 Exhaust fan system

This shall be capable of controlling the flow rates and maintaining the specified pressure differential between the connecting duct and the furnace when the fire damper is closed.

The 300 Pa (or higher if applicable) pressure differential shall be regulated by a suitable control system. The pressure shall be controlled to within  $\pm 5\%$  of the specified value.

## 5 Test conditions

The heating conditions and the furnace atmosphere shall conform to those given in EN 1363-1, or if applicable, EN 1363-2.

The furnace pressure shall be controlled to EN 1363-1, except in the case of testing fire dampers installed in a vertical separating element when the pressure shall be controlled to  $(15 \pm 3)$  Pa at mid height of the damper. If two such fire dampers are being tested simultaneously, this pressure shall be established at mid height of the lower fire damper.

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For fire dampers installed in a horizontal separating element the pressure shall be controlled to  $(20 \pm 3)$  Pa at 100 mm below the underside of the separating element to which it is fixed.

Details of pressure conditions within the connecting duct are given in 9.2.

**6 Test specimen****6.1 Size**

For the fire test, see 10.4, the maximum size of fire damper shall be tested. For the determination of leakage at ambient temperature test, see 10.3, both the smallest and the largest size fire damper shall be tested.

**6.2 Number of tests****6.2.1 General**

The number of tests depends on various factors:

- supporting construction,
- method of installation in the supporting construction,
- method of installation on to the supporting construction,
- method of installation away from the supporting construction,
- blade pivot axis,
- application with no ducting on one or both sides, where additional evidence of insulation in such applications is required.

It may be seen that there are considerable combinations of supporting constructions, installation methods, etc. and this leads to a large number of tests.

Reference should be made to the extended field of application standard before starting a test program as careful consideration of this may reduce the number of tests that need to be completed. It is advisable that this is done in conjunction with a notified body or test authority.

**6.2.2 Supporting construction**

Typical supporting constructions would be masonry walls, blockwork walls, dry walls, concrete floors, etc. Other supporting constructions may be available and these should be used if it is proposed that the fire damper be tested in conjunction with them.

**6.2.3 Method of installation in the supporting construction**

Each method proposed for installation in each supporting construction shall be tested. The fire damper shall be tested both ways round.

**NOTE** There were many discussions on symmetry in the revision and development of this standard. It proved impossible to define symmetry in an objective way to allow all test or authorizing bodies to apply rules in a similar way, particularly in the case of installation in the supporting construction. It was also to be considered where the damper was installed in the depth of the wall and so on. The concept of symmetry has been removed from the standard.